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WEED

MANAGEMENT

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1.0 PURPOSE AND NEED

The purpose of this environmental analysis (EA) is to assess management options for weeds on about 105,867 acres administered by the Montana Department of Fish, Wildlife and Parks (FWP) in north-central Montana. Subject lands in FWP Region 4 covered by this EA include 50 fishing access sites (FAS), 4 state parks, 1 state park program, and 7 wildlife management areas (WMA's) in Lewis and Clark, Cascade, Choteau, Teton, Pondera, Toole, Liberty, Glacier, Meagher, Judith Basin, Fergus, and Petroleum Counties, and for the purposes of this Environmental Assessment, FAS's in Region 6 lying in Hill and Blaine Counties. Also included is the FWP Region 4 headquarters facility in Great Falls. A table giving the general location of these sites is included in the Region Four Weed Management Plan.

These lands are important resources for residents and visitors providing recreational access to many Montana rivers and lakes, wildlife habitat, as well as important recreational and cultural parks and sites. It is essential to maintain their natural vitality and encourage management which contributes to the quality of life for present and future generations of Montanans.

Noxious weeds have invaded most subject lands in Region 4. The impact of weeds on biological communities, ecosystem processes, and Montana's economy is well documented. Montana has recognized the damaging effects of weeds and has enacted laws and regulations to reduce the introduction and spread of noxious weeds. All counties within Region 4 have adopted weed management programs to help control noxious weed populations. FWP has adopted a statewide weed management policy that:

"seeks to prevent, to the extent feasible, the reproduction and distribution of agriculturally undesirable plant species throughout department land or from department lands onto other lands."

Many separate local, state and federal agencies share jurisdiction over weed management activities, especially the use of herbicides. These jurisdictions include concerns over the manufacture, transportation, use and disposal of herbicides. Agencies include local and state health departments, weed control boards, water quality organizations and hazardous waste regulators as well as the federal Environmental Protection Agency and Department of Transportation. Cooperative relationships with FWP which affect weed management activities include those with DNRC- Trust Land Management Division, Montana Power Company, Cascade, Hill, Meagher and Teton Counties, and individual private landowners.

FWP is implementing a Weed Management Plan on subject lands in Region 4 that utilizes an ecological approach for managing noxious weeds by integrating prevention, public education, and cultural, mechanical/manual, chemical, and biological control methods. In addition the plan describes inventories for plant species and site conditions, prioritizes weeds for treatment, and prescribes management options for each site.

State Parks, FASSs, and WMA's are widely distributed in Region 4. Site conditions, such as rainfall, soils, surface water, groundwater and topography vary considerably. General information regarding environmental conditions at each site will be identified as a precursor to initial weed management planning. Region 4 is currently managing weeds on subject lands. Because of these efforts, the information collected for these sites is believed to be sufficient to begin the weed management process. Many FWP lands in Region 4 share similar characteristics and are part of a bioregion with generally common physical, natural and cultural characteristics. These common characteristics are used in this EA to evaluate sites and make recommendations for weed management practices.

An Environmental Analysis was determined to be the appropriate level of analysis for weed management in FWP Region 4. This level of analysis was considered appropriate for the following reasons:

- The limited acreage of FWP lands compared with total infested areas in Region 4.
- The small acreage to be treated with herbicides on annual basis.
- The use of EA level review for other recent, local weed plans at FWP Regions 1, 2, 3, and 5, Glacier National Park and the Flathead Indian Reservation.
- The similarity of this project to other recent weed management projects.
- The low risk of negative impacts and the low probability of identifying new impacts not discussed fully in other recent EAs.

2.0. ALTERNATIVES

Two alternative weed management programs were selected for analysis including the No-action Alternative (maintain current efforts) and the Proposed Action Alternative (Integrated Weed Management). These two alternatives were considered the only alternatives that were realistic and represented a logical course of action for management of noxious weeds. Differences among alternatives include the level of involvement with the public in weed management decisions, degree of coordination with county, other state, and federal agencies, weed management levels, responsiveness to legal and regulatory requirements, and monitoring weed control efforts.

2.1 Alternative 1: No Action

The present weed management program including mowing and hand pulling, biological control releases, and herbicide applications would be maintained at present levels and no additional effort will go toward weed management. There would be no formal weed management plan that outlined strategies, options, and proposed management methods available for public review. This alternative emphasizes management of weed infested areas through limited mowing, manual methods, release of biocontrol agents, and herbicide use. Prevention and public education programs on noxious weeds, and site specific plant inventories would be limited. Licensed pesticide applicators currently with FWP, and contractors would continue herbicide applications.

2.2 Alternative 2: Proposed Action

Alternative 2 emphasizes an ecological approach to managing noxious weeds through Integrated Weed Management (IWM) incorporating prevention, public education, and cultural, manual/mechanical, biological and chemical control methods. A formal Weed Management Plan outlining weed concerns, acreage infested on FWP lands, and specific management methods proposed for use at a site is written and available for public comment. Weed management methods selected under the IWM approach will vary with environmental conditions, weed species and acreage infested, land use, land management objectives, budgets, and effectiveness of the control method on the target species. An important part of IWM is consideration of all management alternatives. Licensed pesticide applicators currently with FWP would conduct or contract herbicide applications.

FWP proposes Alternative 2 (IWM) as the preferred action for managing weeds on lands administered by the agency in Region 4. This planned approach allows FWP to outline the current status of noxious weeds on Region 4 lands, and develop coordinated programs with input from private citizens, and county, state, and federal agencies regarding weed management strategies, control methods, and public education programs. A more detailed description of

Alternative 2 is described in the Montana Department of Fish, Wildlife and Parks Region 4 Weed Management Plan.

2.3 Comparison of Alternatives

The alternatives under consideration both use a variety of methods for addressing noxious weed concerns on FWP lands in Region 4. Each alternative is evaluated in relation to a variety of important natural resources. Other concerns are also addressed including human health, effectiveness of management methods, and legal mandates.

Alternative 1 would continue the use of biological, mechanical and chemical controls. Under this alternative, there is a greater potential for newly invading weed species to become established on FWP managed lands, and some weed species may continue to increase. Water quality may decline since a planned approach for herbicide applications and a spill response plan would not be written. Without comprehensive site-specific inventories threatened, endangered or rare plant and animal species may be impacted by weed management techniques. Site priorities would be more difficult to assess without detailed site-specific information. Native vegetation and wildlife would be impacted if weeds continued to spread. Private citizens, including landowners adjacent to, or downstream from FWP sites, and county, state and federal agencies would not be involved in developing management criteria for weeds.

Human health concerns include exposure to herbicides, injury from mechanical and manual control methods, and weed pollen. Legal concerns include administrative and civil liability for uncontrolled weeds, wildlife depredation, and for unwanted herbicide effects.

Alternative 2 uses a flexible combination of weed management methods specifically adapted to weed and site conditions at individual locations. Integrated Weed Management involves the consideration of all management methods, and selection of a method(s) best suited for individual species based on a variety of ecological and environmental factors. Air, soil, water, wildlife and fisheries resources may have short-term, minor impacts if accidental spills or misapplication occur. Native vegetation will be improved by eliminating weed competition. Wildlife will benefit from an increase in native plant species. A planned approach also includes strategies for on-site vegetation surveys, weed prevention and public education about noxious weeds, and prioritizes weeds for management.

Risks associated with this alternative are less than Alternative 1 because of site-specific guidelines developed in the plan for weed management activities. Weed management under an IWM will provide optimum control for an individual species given ecological and environmental constraints. Legal concerns mainly relate to potential herbicide exposure. Costs for the IWM program would be moderate and can be made flexible depending on budgets, manpower and other factors.

2.4 Alternatives Considered but Not Given Detailed Study

Chemical Control Only emphasizes the reduction and eradication of noxious weeds by the exclusive use of herbicides. This alternative is designed to provide the greatest control of noxious weeds at the lowest cost. Management of noxious weeds would be considered a priority with environmental concerns a secondary issue. This alternative was not studied in detail because of the potential impact of herbicides on surface and ground water resources, and sensitive vegetation present on FWP managed lands.

Cultural, Mechanical, and Biological Control (Non-chemical) emphasizes the use of other weed management methods with the exclusion of herbicides. Manual/mechanical methods can be relatively effective against small infestations of accessible, non-rhizomatous weeds. However a treatment regime that relied primarily on these methods would not be feasible and would be prohibitively expensive on large infestations. The availability of effective biological control agents is limited on many weeds present on FWP managed lands. This would allow weeds such as the knapweeds and newly invading species to continue to establish and spread under this option.

2.5 Weed Management Methods

Weed management methods proposed for subject lands in FWP Region 4 include education of the general public and FWP employees regarding weeds, prevention programs on newly invading species, and cultural, manual/mechanical, biological and chemical control technique. Integration of more than one method provides the optimum management of many weed species. On some sites, herbicide applications are expected to reduce weed densities to levels where manual methods are more effective. All management techniques will be considered equally in the IWM program. The goal of the proposed alternative is to develop an ecologically based program for noxious weed management on all lands administered by FWP Region 4.

2.51 Education

Education about noxious weeds will become an important component of the weed program under the proposed alternative. Educational efforts will be coordinated with county, state, and federal entities and will target the general public and FWP employees and volunteers. Education will be focused within the following areas:

- Weed identification including newly invading species
- Impacts of weeds on wildlife and native plant communities
- Management methods that are successful on various weed species.
- Reporting new infestations

2.52 Prevention

Preventing the introduction and establishment of newly invading weed species will be stressed under the proposed alternative. Increasing the involvement of volunteers, FWP employees, and the general public will help in reporting new weed species. In addition, annual monitoring of high risk areas, and “quick response” eradication programs on newly established species will help protect sites from invasion.

2.53 Cultural

Cultural methods on most sites will involve maintaining or improving native plant communities in a healthy condition and minimizing soil disturbance to reduce susceptibility to weed invasion. Intensive methods such as irrigation and fertilization to improve competitive ability of grasses will only be used on sites such as Giant Springs Heritage State Park or during rehabilitation of a site.

2.54 Manual/Mechanical

Mechanical and manual methods will continue to be utilized for weed control on subject lands in Region 4. On some sites, where manpower is available, these methods may provide adequate weed control. Mechanical/manual methods to be used on subject lands in FWP Region 4 include:

- Revegetation
- Digging/hand-pulling
- Mowing/weed cutting
- Traffic control

Since it is unlikely that FWP budgets will allow sufficient manpower to provide weed control in all areas, volunteer groups will be encouraged to assist FWP. Sportsmen, students, church groups, clubs, scouts and other individuals and organizations will be solicited for these projects.

2.55 Biological Weed Control

Biological control agents have been released on 121 sites on FAS's, SP's, and WMA's on FWP managed land in Region 4. A list of agents that are presently released is described in Region 4 Noxious Weed Management Plan. The Region will maintain biological control as an integral part of the IWM program. FWP will coordinate with county, state, and federal entities to collect and distribute biological control agents, and provide insectary (rearing) sites or research locations to support the biocontrol efforts. Monitoring the establishment and effectiveness of various agents will be an integral part of the IWM effort.

2.56 Chemical Weed Control

Herbicides proposed for use within the IWM program include picloram (Tordon), clopyralid (Transline), clopyralid + 2,4-D (Curtail), 2,4-D, metsulfuron (Escort), fosamine (Krenite),

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dicamba (Banvel), and glyphosate (Roundup and Rodeo). These herbicides have been registered by the Environmental Protection Agency (EPA), and approved for use in the state of Montana. They are the most effective herbicides for controlling weeds presently infesting FWP managed lands in Region 4. With the exception of Rodeo and Roundup, herbicides described above are selective for broadleaf plants allowing grasses to continue to grow. Roundup and Rodeo are non-selective herbicides which will remove both grasses and broadleaf plant species. These herbicides may be used alone or in approved combinations. Appendix C of the Weed Management Plan contains material safety data sheets (MSDS) for each of these herbicides. Other herbicides, approved for use by the EPA and registered for use in Montana, may be considered in the future. New chemicals proposed for use will be reviewed by FWP resource staff before approval.

Herbicides will be applied according to label directions, concerns for threatened, endangered and sensitive (TES) species, and other site-specific constraints required by the Regional Weed Management Plan. Herbicide applications will be supervised by an applicator licensed in the State of Montana. This licensed applicator will be a FWP employee if applications are made by FWP. Contracted applications will also be supervised by a licensed contract applicator and monitored by a FWP licensed applicator.

Site-specific plans list types of management best suited for site conditions, weed species, and acreage infested. Herbicide use will depend on the management objective, season, weed species, weed growth stage, acreage infested, ecological and environmental factors, expected cost, and equipment limitations. The herbicide product selected and application method will depend on weed species, weed density, non-target vegetation (especially threatened, endangered and sensitive species), wildlife, and presence of surface waters, wetlands, shallow groundwater or groundwater recharge zones. Rates will be the lowest necessary to achieve management objectives for the site and target species.

Vehicle-mounted sprayers (hand guns, booms) will be used primarily along roadways and in off-road areas which are readily accessible by vehicle. Vehicle use will be restricted where soil or vegetation may be significantly disturbed. Examples of restrictive conditions include moist, compactable soil and/or steep slopes. Boom applicators will only be used where weeds are sufficiently concentrated. Hand gun application will be used for spot treatment of weeds in vehicle accessible areas. Under both hand gun and boom methods, chemicals will be applied in a manner that gives the best coverage with the least amount of drift.

Hand applications will be made with backpack sprayers and wick/wiper applicators. Backpack sprayers will be used on small or scattered patches in rough terrain or environmentally sensitive areas. Herbicides, such as glyphosate, will be used to treat individual plants or for seedbed preparation.

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Precautions for use will include at a minimum:

- Herbicide applications will not be conducted when wind velocities exceed 10 mph.
- During application periods, weather conditions, especially wind speed and temperature will be measured hourly by applicators.
- Calibration checks will be conducted at the beginning of the spraying season and periodically throughout to ensure that equipment is functioning correctly.
- Label requirements will be followed for all herbicide applications. Further precautions may be determined to be necessary during the pre-treatment reviews.
- All contract chemical applications will be made by a licensed applicator.

The herbicide program will be evaluated annually as part of the overall weed monitoring and evaluation program.

2.57 Integrated Weed Management

Integrated weed management (IWM) is a flexible combination of education, prevention, and cultural, mechanical, biological and chemical control methods. Integrated Weed Management utilizes all tools to establish an ecological weed management program. The success of IWM depends on the ability to select control techniques that meet the management goals for a site, monitor results, and adjust the program as necessary.

3.0 AFFECTED ENVIRONMENT

3.1 Setting

FWP Region 4 valleys are drained by the Missouri from Holter Dam to the mouth of the Musselshell river, and its tributaries: the Smith, Marias, Dearborn, Judith, Sun, Milk, Teton, Belt Creek, and many others. Most of the urban, residential and agricultural development is located in the major river valleys. Great Falls is the largest population center with 55,000 people.

Fishing access sites are located in the valley bottoms adjacent to rivers or reservoirs. State Parks comprise a variety of sites including uplands, mountain slopes, and stream floodplains. Wildlife Management Areas are primarily located in mountain and foothill topography. Subject lands covered by this EA include 4 state parks, 1 state park program, 50 fishing access sites, 7 wildlife management areas and FWP regional headquarters. This discussion of affected environment focuses on conditions at these sites.

3.2 Air Quality

Air quality throughout Region 4 is good and all areas meet state and federal air quality standards.

3.3 Geology and Soils

Geology within Region 4 is complex with a wide variety of rock types and geologic processes. Tectonic faults have created much of the mountain landscape seen today particularly at the Rocky Mountain Front. The mountain bedrock in Region 4 is predominantly made up of Precambrian Belt Supergroup formations of argillites, quartzites and limestone. Other common rock types in Region 4 include granites, volcanics and younger limestones. The plains of Region 4 extend from the Rocky Mountain Front and are intermixed with isolated island mountain ranges - the Highwoods, Bearpaws, Sweetgrass Hills, Little Belts, Big Belts, and Judiths. To the east of the Judiths the plains stretch to the Mississippi river. From the plains in the east to the continental divide in the west Region 4 is very diverse in geologic resources.

Local valley bottoms have been reworked by glacial activity during the Pleistocene period. Glacial deposits left behind include till, drift, outwash and glacial lake deposits in the upper valley areas. The lower valley areas have outwash and glacial lake deposits. Recent stream deposits (alluvium) are located along floodplains and on low terraces adjacent to floodplains.

The most common geologic material on State parks and Fishing Assess Site lands in Region 4 is alluvium consisting of sand and gravel weathered from mixed rock types. In glaciated areas, this alluvium may include glacial outwash which may have larger rock sizes and higher sand content.

At other sites, this alluvium was deposited by the current rivers and streams. WMA's are dominated by bedrock formations with some glacial features.

Soils at FWP sites in Region 4 have properties that are dominated by their geologic origins. Soils can be divided into 4 major categories: (1) coarse to fine textured soils formed on glacial till plains north of the Missouri River; (2) medium to coarse textured soils formed on low terraces, alluvial fans, and floodplains associated with major perennial streams; (3) coarse to fine textured soils on foothills, terraces, and glacial moraines; and (4) steeply sloping, thin soils weathered from bedrock within the western and southwestern mountainous portion of the Region. In general, soils at FAS along floodplains are highly variable ranging from coarse to fine textured, and low to high organic matter content. Upland soils are finer in texture and are mostly silt and silty clays. These soils mostly occur above the floodplain near the lower reaches of the Missouri below Great Falls. Wildlife Management Areas are typically mountainous with the exception of Freezout Lake WMA which is a marshy lake. Soils at WMAs vary tremendously with the bedrock parent material. Most soils are thin, poorly developed soils on relatively steep slopes. Where extensive soil development has occurred it is usually a loamy sand or clay loam.

Ulm Pishkun State Park is unique among Region 4 State Parks in that it is not associated with a water body. This site is located on uplands with moderate to fine textured soils.

3.4 Water Quality

Most subject lands in Region 4, have both surface and groundwater quality concerns. Surface water from rivers and lakes is used for irrigation and often as drinking water supplies. Water quality is important for these uses and many others including fisheries and wildlife habitat. Groundwater is used as a source for drinking, irrigation and stockwater throughout much of Region 4 and is also an important source of recharge for many surface water supplies. Since groundwater is used for drinking supplies and surface recharge, its quality is essential to protecting human health. Ground water discharge also is the centerpiece for Giant Springs State Park and it's quality is of utmost concern to the Department.

3.41 Surface Water

FWP Region 4 includes Missouri River drainage from Holter Lake to Fred Robinson Bridge. Major tributaries are the Smith, Marias, Dearborn, Judith, Sun, Milk, Teton, and Belt Creek. Principal standing water bodies include Holter, Pishkun, Eureka, Willow, Nilan, Bear Paw, Bynum, Martinsdale, and Newlan Creek Reservoirs. Other water bodies are Ackley, Bean, and Arod Lakes, and Carter Ponds.

Land use over the past century has affected surface water quality throughout Region 4. Mining, logging, agriculture, hydropower, and urban development activities have reduced water quality

significantly at specific sites and generally across the entire area. Despite these activities surface water quality in Region 4 is remarkably pure. The Montana Department of Health and Environmental Sciences has inventoried surface waters throughout the state and identified "impacted streams". The only impacted water body in Region 4 is Muddy Creek - a tributary of the Sun River. Streams classified as "I" (impacted) do not meet fishable and swimmable goals as defined in the Clean Water Act. The goal of the State of Montana is to have these streams fully support: drinking, culinary and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of fishes and associated aquatic life, waterfowl, and fur bearers; and agricultural and industrial water supply. FWP does not have any land on Muddy Creek.

The Missouri River from Holter to Fred Robinson Bridge is classified as a "B-1" to "B-3" River which means it changes from a stream suitable for growth and propagation of salmonid fishes to a stream suitable for growth and propagation of non-salmonid fishes. This change is natural and is to be expected as the Missouri changes from a fast running, cold, mountain stream to a slower moving, warmer, prairie stream.

Most other streams and lakes within Region 4 are classified as "B-1" which means the water is:

"... suitable for drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming and recreation: growth and propagation of salmonid fishes and associated aquatic life, waterfowl and fur bearers; and agricultural and industrial water supply" (ARM, Title 16, Chapter 20).

Although most community drinking water systems in Region 4 use groundwater sources, several communities obtain portions of their drinking water from surface supplies including:

Municipal Water Supply

Great Falls

Cascade

Fort Benton

Surface Water Source

Missouri River

3.42 Groundwater

Groundwater is the principal source of drinking water for most residents of north-central Montana. It is often the only source of water for residences and communities that lack a central water supply system. Even in cities with a municipal surface water system, some residents and businesses use groundwater.

The principal drinking water aquifers are relatively shallow and composed of alluvial sediments in both wide valleys and narrow canyons. These alluvial aquifers are typically unconfined systems with groundwater depths varying from the ground surface to more than 100 feet. Although the specific geology may vary, these aquifers are commonly composed of coarse geologic material. Recharge to valley-bottom aquifers comes principally as leakage from streams. Recharge from flood irrigation and leakage from irrigation ditches is locally an important input to groundwater. Other minor recharge sources include local precipitation and discharge from underground septic systems.

It is believed that Giant Springs has its recharge source in the Little Belt Mountains where the Madison Limestone is exposed for many miles. This groundwater takes approximately 2900 years to reach Giant Springs where fissures in the limestone and overlying sandstone allow the groundwater to reach the surface. Except at the recharge area in the Belt Mountains and the discharge area at Giant Springs this aquifer is believed to be a closed system.

Although general water quality varies considerably throughout Region 4, most groundwater is very high quality. Water quality problems sufficient to cause well closures have mainly occurred around urban areas. Chemical contamination has included petroleum products, volatile organic chemicals, septic wastes (nitrates, phosphates, bacteria), and other manufactured compounds.

3.5 Vegetation

Vegetation in Region 4 varies from landscaped urban areas and agricultural crops, to riparian zones, grasslands, shrublands, cottonwoods, conifer forests and alpine tundra. Although logging, agriculture, mining and urban development have altered natural vegetation throughout Region 4, much of the landscape is still dominated by native plants. The areas where vegetation has been most altered by man's activities are the plains, especially near surface water. Fishing access sites and several state parks are located within this area.

Vegetation on subject lands in Region 4 is highly variable. Riparian vegetation occurs near lakes and streams and where water tables are within plant rooting depths. These habitats have large numbers of different plant and animal species. Riparian habitats in Region 4 often have tree canopies of black and narrowleaf cottonwood, aspen, ponderosa pine, limber pine, Douglas fir and Rocky Mountain juniper. Riparian shrubs include many willow species as well as dogwood, hawthorne, roses, alder and others. Sedges, rushes, cattails and other moist site species are also common.

Grassland/shrubland vegetation is common on terraces and foothill slopes. Native shrubs on these sites include woodrose, currant, yucca, chokecherry, rabbitbrush, and sagebrush. Common native

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grasses include rough fescue, Idaho fescue, bluebunch wheatgrass, needle & thread, June grass, and blue gramma.

Coniferous trees dominate mountain slopes on FWP lands in Region 4. Douglas-fir, limber pine, and ponderosa pine are the most common species occurring on these sites.

Agricultural croplands cover significant areas of valley bottoms in Region 4. Small grain crops dominate dryland agricultural production. Alfalfa and grass hay, and small grain crops are produced on irrigated lands. In addition, canola, seed potatoes, and other specialty crops are grown on a limited basis.

Noxious weeds and other non-native species have replaced native plants in disturbed areas of most state park, fishing access sites and wildlife management areas. Canada thistle, leafy spurge, and spotted knapweed infest the greatest acreage. Other weeds of concern include dalmation toadflax, purple loosestrife, sulfur cinquefoil, whitetop, Russian knapweed, yellow mignonette, and black knapweed. Noxious weeds infest 608 acres within Fishing Access Sites, 221 acres in State Parks, and 580 acres on Wildlife Management Areas. Acreage infested with noxious weeds is about 1.3% of the total acres managed by Region 4. A detailed description of weed species and acreage infested on each site type is included in the Weed Management Plan.

Weed densities at FWP sites range from scattered individual plants to nearly complete coverage of sites. These plants reduce biodiversity, alter ecosystem processes, reduce wildlife forage and habitat, increase soil erosion, impact recreational use, and alter the aesthetic quality of a site. Weeds also have a tremendous economic impact to the state of Montana. The close proximity of FWP sites to water and roads, and frequent visitation by people and vehicles increases the susceptibility of these sites to weed invasion.

Some plant species found in north-central Montana are threatened and may be protected under the Federal Endangered Species Act of 1973 (50 CFR Part 402). Currently there are no plant species in Montana listed as federally endangered. A number of plants have been designated as "sensitive species" by the Montana Natural Heritage Program. These plants are considered to have potential for future listing as threatened or endangered. Several sensitive plant species have been found on FWP managed lands including Freezout Lake, Ear Mountain, Blackleaf, and Beartooth WMA's and Giant Springs/Heritage State Park. A list of species and location maps are shown in Appendix A. A comprehensive survey is in progress to determine if there are other sensitive species growing on FWP managed lands.

3.6 Wildlife and Wildlife Habitat

FWP lands in north-central Montana provide habitat for a tremendous diversity of wildlife species. Many of these sites are dominated by riparian areas which are particularly rich in animal life.

Common large animals include elk, mule deer, white-tailed deer and antelope. Less common are moose, black bear and grizzly bear. Common predators include mountain lion, gray wolf, coyote, bobcat, red fox, and badger. Raptors both live here and use the Rocky Mountain front as a major migration route. Species include bald and golden eagles, roughlegged and red-tailed hawks, osprey, prairie falcon, turkey vulture, kestrel and several species of owls. Small animals make up a substantial prey base for these birds such as ground squirrels, voles, gophers, mice, and rabbits. Other small mammals in Region 4 include beaver, muskrat, otter, mink, skunk, porcupine, weasel, marmot and raccoon.

Numerous upland bird species and waterfowl inhabit or visit FWP sites in Region 4. The most common include blue, spruce, ruffed grouse as well as exotics such as gray partridge and ring-necked pheasants. Sandhill cranes and great blue heron are common in wetlands and near open water. Canada and snow geese, tundra swan, and mallard, pintail, gadwall, teal, widgeon, merganser, and golden-eye ducks and many other species of waterfowl are found in Region 4.

Federally listed endangered species in Region 4 include the northern Rocky Mountain gray wolf, peregrine falcon, and bald eagle. Grizzly bears are listed as a threatened species. The spotted frog (*Rana pretiosa*) is listed as sensitive. A list of threaten, endangered, and sensitive species designated by the Montana Natural Heritage Program and location maps are shown in Appendix A.

Natural habitats with good quality water and suitable vegetation are essential to survival and reproduction of wildlife. Most valley bottom wildlife habitats in Region 4, especially along the streams, have been dramatically altered by agriculture or urban development. Where soils have been disturbed, and not replanted, weeds have replaced the native plants. Most of these alterations have resulted in less food, shelter and security for dependent wildlife species.

3.7 Fisheries

Rivers and lakes within Region 4 support a variety of game and non-game fish including several trout species as well as whitefish, walleye, northern pike, sauger, perch and bass. Many local streams and their fish populations have been impacted by mining, silviculture, agriculture, and other human activities.

Westslope cutthroat trout and bull trout are listed by the American Fisheries Society as "Species of Special Concern". This designation means that the cutthroat trout has limited numbers and/or

habitat in Montana and throughout North America. The elimination of these species in Montana could have a significant effect on the gene pool of the species or subspecies. Westslope cutthroat trout are listed as sensitive species and pallid sturgeon are listed as an endangered species by the US Fish and Wildlife Service. Fluvial grayling populations are present in Region Four and are of great interest to our fisheries biologists.

Individual fish species are distributed according to habitat needs and conditions. They can be found at all Fishing Access Sites and most State Parks in Region 4.

4.0 ENVIRONMENTAL CONSEQUENCES

This section addresses environmental consequences of the two alternatives. Since both alternatives include chemical, biological, cultural, and mechanical/manual management methods, environmental consequences will be discussed jointly for both action alternatives.

4.1 Air Quality

Air quality would not be significantly affected by either alternative. Herbicide use could result in a minor, localized, temporary impact on air quality when herbicides are suspended in the air. Both spray drift and volatilization can affect air quality. Spray drift, the movement of airborne particles from the target area, poses the greatest air quality concern. Extent of drift depends primarily on the size of the spray droplets and wind speed. Droplets most prone to drift are those less than 100 microns in diameter (Klingman and Ashton, 1982). The majority of application equipment in Montana is calibrated to produce spray droplets from 200 to 400 microns in size. Drift from herbicide applications will be reduced following the following mitigation measures:

- Applications will only be made when wind speeds are less than 10 miles per hour.
- Nozzles on application equipment and pressure will be monitored so that droplet size is greater than 100 microns.

Herbicides can also move through the air in volatilized (gaseous) form. Volatilization is reported to be negligible with Roundup, Rodeo, Krenite, Tordon 22K, Transline, and Escort. With 2,4-D, volatilization depends on the formulation; amines are less volatile than esters, which vary from high to low. The oil-soluble amines are considered the least volatile. Banvel may volatilize from soil or leaf surfaces, especially under hot temperatures (Table 4-1).

4.2 Soils

Soils may be impacted from herbicide application, livestock grazing, cultural and manual or mechanical weed management methods.

Herbicide Treatments:

Potential impacts to soil from herbicides include loading (accumulation of herbicide residues) and alteration of soil flora and fauna. Since herbicides will be mixed and loaded well at the application site there is little potential for accumulation of herbicide residues at a specific site. If an inadvertent spill occurs, mitigation measures outlined in the Weed Management Plan will be implemented. Effects of herbicides on soil organisms are expected to be of short duration and not significant (Audus, 1976). Table 4-1 indicates properties of herbicides proposed for use on FWP sites and their interaction with soils, water, and air.

Table 4-1: Properties of herbicides proposed for use on FWP Region 4 managed lands².

Trade Name	Chemical Name	Half-life ¹ (days)	Mobility	Leaching Potential	Runoff Potential	Degradation Process	Photo Degradation	Volatility
Tordon 22K	picloram	28 to 400	high	high (sandy soils most susceptible)	low	microbial	moderate	negligible
Transline/Curtail	clopyralid	12 to 70	high	high (sandy soils most susceptible)	low	microbial	negligible	low
Escort/Ally	metsulfuron	7 to 45	high	moderate	low	hydrolysis microbial	negligible	negligible
Krenite	fosamine	8 to 30	low	low	moderate	microbial	negligible	negligible
Banvel	dicamba	14 to 90	high	high	low	microbial	negligible	low-mod
Roundup/Rodeo	glyphosate	47 to 90	v. low	v. low	high	microbial	negligible	negligible
2,4-D amine/ester	2,4-D	7 to 28	moderate	low - med	low-med (salts more leachable than esters)	microbial	low	formulation dependent esters highest

¹ Factors affecting herbicide half-life are temperature, moisture, soil organic matter, photo decomposition, plant uptake, microbial and chemical degradation.

² Information from Colby et. al. , 1989; USDI, 1985; and Meister, 1991.

Herbicide half-life (persistence) is the time required for half the amount of herbicide introduced into a living system to be eliminated or degraded by natural processes. Chemical, physical, and microbial processes in the soil influence the breakdown and movement of herbicides.

Environmental factors such as temperature, moisture, and organic matter, herbicide properties, and application rates will also affect the persistence and mobility of herbicides in soil. In general, herbicide breakdown is more rapid in warm, moist soils, high in organic matter. These conditions favor microbial populations that are the major degradation pathway for most herbicides proposed for use by FWP (Table 4-1).

Tordon 22K is the most persistent herbicide that is proposed for noxious weed control. Persistence is not a negative characteristic when managing noxious weeds, provided the mobility of the herbicide is controlled. Knapweed, leafy spurge, and other noxious weeds produce many seeds that remain viable in the soil for long periods. Long-term control requires either multiple applications of low-persistent herbicides such as 2,4-D, or less frequent applications of a more persistent herbicide. There are several studies on the movement and persistence of Tordon 22K that have been conducted in western Montana. These studies will be discussed in detail in the following Water Quality section of this EA.

Other Methods:

Mechanical/manual methods for controlling weeds include tillage, mowing, hoeing, and hand-pulling. Mechanical methods that directly disturb soil by removing vegetation and exposing the soil surface increase potential for soil loss by wind and water erosion. If a soil crust develops while the soil is exposed, infiltration rates will decrease and runoff will increase. Soil compaction occurs on loosened soil when a disturbed area is reseeded, particularly if the soil is wet. Disturbed sites will be reseeded as soon as conditions permit to reduce risk of erosion.

Biological methods that use grazing animals may reduce plant cover and expose soil to wind and water erosion. Compaction may also occur if overgrazing is allowed on wet soils. Potential impacts to the soil from insects and pathogens would be minimal. Monitoring grazing livestock to improve surface litter, and proper grazing use will mitigate potential risks from grazing.

4.3 Water Quality

Herbicide Treatments:

Herbicides may enter surface water either through non-point sources such as spray drift, erosion of soil containing herbicides, ground water discharge, irrigation return flows, and surface runoff. Point source problems such as improper cleaning, mixing, loading activities, and accidental spills of herbicides can also enter surface and ground water.

The potential for a herbicide to reach surface water through runoff is a function of herbicide

characteristics, application rate, soil texture, slope, vegetation, the length of time between application and rainfall, and distance to the water. Tordon and 2,4-D have been reported to enter surface water through runoff. However, a study conducted by the EPA to measure runoff of Tordon concluded that, under field conditions, Tordon 22K does not present a serious threat to water quality a short distance downstream from the application site (Evans and Duseja, 1974). Runoff potential of most other herbicides proposed for use should be similar to that of Tordon 22K. The strong adsorption characteristics of Roundup to soil particles makes it unlikely to reach ground or surface water through leaching, however, it may be detected in surface water if soil particles are moved into a watercourse during rainfall.

The herbicides Tordon 22K, Transline, Curtail, 2,4-D, Banvel, and Escort are considered mobile in the soil environment (Table 4-1). Areas with relatively shallow water tables, unconsolidated sand and gravel materials, and rapid to moderately rapid permeable soils containing little or no organic matter are highly susceptible to ground water degradation by herbicides. In shallow bedrock areas, herbicide laden water could potentially leach to bedrock, migrate along the bedrock surface, and arise downslope in off-target areas. Bedrock fissures could act as conduits to ground water movement.

In most areas in western and central Montana, soils retain almost all available moisture within the upper 2 feet of soil. Thus, there is little opportunity for herbicide leaching to occur. Several studies have been conducted on the movement and persistence of Tordon 22K in soil and its potential for surface and ground water contamination. Results of these studies indicate that Tordon 22K applied at 1 pint per acre (recommended rate for knapweed control) moved to a maximum depth of 20 inches in 90 days. Thirteen percent of the herbicide remained in the soil 365 days following treatment. An application of Tordon 22K at 2 quarts per acre moved to a maximum depth of 40 inches in the soil. The highest concentrations of Tordon 22K were located in the upper foot of soil at both locations. Tordon 22K was not found in either surface or groundwater resources at either site (Watson et. al., 1989).

Rice and co-researchers (1992) studied soil mobility of Tordon 22K, Transline (clopyralid), and Curtail (clopyralid + 2,4-D) on western Montana grassland and forest sites. Study results confirm that clopyralid and 2,4-D are less persistent than Tordon 22K. Clopyralid and 2,4-D were not detected at any time below a 10 inch soil depth. Tordon 22K was detected in the 10 to 20 inch soil strata within 30 days of spraying, but was not detected below 10 inches 1 or 2 years following application.

Results of these studies show that very little leaching occurs under dryland range and pasture conditions, indicating that herbicides proposed for use by FWP can be safely applied on many sites without posing a risk to ground water resources. On-site inspections of soil, vegetation, and

water features will be conducted on each area prior to spraying to identify high-risk sites for herbicide applications. Only aquatic labeled herbicides will be used within 10 feet of surface and shallow groundwater areas, and the use of low-persistent herbicides on steeply sloping sites will further mitigate risk of contaminating surface and ground water resources through runoff.

Mechanical/manual and biological management methods will be used in areas where water quality is a special concern.

Herbicide drift from spray applications may directly enter surface water. The amount of spray drift depends on the herbicide formulation, size of droplets, wind, and height above ground from which the spray is released. The use of hand application equipment such as hand guns, backpack sprayers, and wick applicators reduce the chance of herbicide drift. In addition, herbicide applications will not be made when wind speeds are greater than 10 mph.

The greatest risk of water quality impacts is from accidental spills. This risk can be reduced by mixing smaller loads of herbicides, and increasing care in applications. Risks can be reduced by establishing and maintaining an effective emergency spill containment plan outlined in the appendices of the Weed Management Plan. In most cases, accidental spills should only impact water quality in a small area due to the dilution factor in most streams or aquifers.

Other Treatment Methods

Mechanical tillage and mowing can result in increased sediment loading in water courses. These methods disturb vegetative cover and consequently increase soil movement. Riparian habitats may be affected by introducing or encouraging intensive grazing.

4.4 Vegetation

Alternative I:

There is greater opportunity for weeds to establish and spread under this alternative since prevention and public education are not an integral part of the weed management effort. The impact of noxious weeds on native plant species, wildlife forage and habitat values, and soil and water resources would increase. The potential to infest other lands from newly invading species established on FWP sites would be higher under this alternative. In addition, there is a greater risk to sensitive species from weed management activities since on-site surveys are not included in this alternative.

Herbicide Treatments

Herbicides, such as 2,4-D, Transline, Curtail, Banvel, Tordon 22K, and Escort are selective for certain broadleaf shrubs and forbs, but have little or no effect on grasses and grass-like plants. Consequently, areas treated with these herbicides would have a decrease in broadleaf plants and an increase in grasses. Herbicide rate and timing of application will determine the selectivity of a

herbicide on non-target tree, forb, and shrub species. A recent study monitored plant community diversity following herbicide treatment of spotted knapweed in western Montana. Tordon 22K at 1 pint per acre, Curtail at 2 quarts per acre, and Transline at 2/3 pint per acre were applied on four sites. Plant diversity declined slightly the first year, but diversity differences between treated and non-treated areas disappeared by the second year. No forbs were eliminated from the plant community as a result of the herbicide application. Researchers concluded that herbicide application is a useful weed management method on sites where the conservation of native communities is a goal (Rice and Toney, 1996).

In general, plants in the asteraceae (composite), fabaceae (legume), polygonaceae (buckwheat), and apiaceae (parsley) families will be affected by Tordon 22K. Banvel and 2,4-D will affect these species, in addition to plants in the brassicaceae (mustard) family. Escort will affect plants in the legume, composite, and mustard family, and Curtail and Transline affect plants in the composite, legume, and buckwheat family. Application of these herbicides may slightly reduce abundance of plants within these families for one year. This impact would be mitigated by a general increase in the health and vigor of most native species as noxious weeds are removed from the site.

Other Treatment Methods

Mechanical treatments such as tillage and mowing would impact non-target vegetation. Manual weed pulling would have little or no impact on non-target species.

Biological methods could include grazing animals, insects, and pathogens. Grazing animals, such as sheep or goats, eat both weeds and desirable species. Both have been shown to selectively graze leafy spurge reducing seed production. Goats are likely to browse more heavily on shrubs that may provide important wildlife food and habitat. The level of management will determine impact of grazing animals on non-target species. Weed seeds can be spread to non-infested sites by adhering to grazing animals or passing through their digestive tract. Restricting livestock use in weed infested areas during seed ripening and dispersal will help reduce weed spread to uninfested sites.

Impacts of insects and pathogens on non-target vegetation generally would be slight. There is only one report of an insect introduced into Montana for weed control that has infested a rare plant. The seed weevil (*Rhinocyllus conicus*) introduced for control of musk thistle, has been reported to infest a rare native thistle (Achuff and Schassberger, 1991). Screening trials now include closely related plants which decreases the potential for impacts on native vegetation.

Mechanical treatments, grazing animals, and herbicides could potentially impact plants considered to be endangered, threatened, or sensitive by the Montana Natural Heritage Program. However,

competition from noxious weeds for light, nutrients and moisture also threaten these species. The impact on these species would be greatest under Alternative 1 since plant surveys on FWP sites would not be conducted. Both alternatives use integrated weed management methods and would reduce weed spread and size of existing infestations.

Managing noxious weeds on FWP lands would have a positive benefit to plant communities, this includes: protection and enhancement of species diversity, ecosystem processes, soil and water resources, and wildlife habitat, and improved productivity of native species.

4.5 Wildlife

Noxious weeds impact wildlife by displacing forage species, modifying habitat structure - such as changing grassland to a forb-dominated community-, or changing species interactions within the ecosystem (Belcher and Wilson, 1989; Bedunah, 1992; Trammell and Butler, 1996). A reduction in weed infestations would have an overall positive affect on wildlife species and habitat. The potential for establishment and spread of newly invading weed species, and resulting impacts to wildlife, is greater under Alternative 1. Chapter 3 describes wildlife and other species that are potentially impacted by IWM methods. This section describes the potential effects for a variety of major species.

Herbicide Treatments

The direct and indirect adverse impacts to wildlife from herbicide applications on FWP sites are expected to be negligible. Cumulative effects from herbicide use are not expected since herbicides proposed for use by FWP do not bio-accumulate in concentrations greater than their general environmental concentrations.

There is the potential under this alternative for wildlife to become exposed to herbicides by ingestion of treated plants or by dermal absorption. It is likely that any exposure would be very small and of short duration. Only where animals have been directly sprayed or fed exclusively on sprayed vegetation have toxic doses been documented (USDI-Bureau of Land Management 1985). Exposure of dogs to meat from an animal that had eaten heavily on sprayed vegetation resulted a dosage of less and 1/400 of the LD₅₀ (USDA-Forest Service 1989).

It is unlikely that wildlife can receive lethal or even large doses of properly applied pesticides except at spill sites. This emphasizes the importance of immediate and effective spill response. If wildlife do ingest a significant amount of pesticide, it is likely that it would be excreted quite rapidly with little effect.

Little information is available on wildlife impacts from treatment in areas used for calving, fawning, nesting, or rearing of young. Disturbance of wildlife species may occur during

application of herbicides at a site.

Bio-accumulation of contaminants in the food chain was of critical importance with the now-banned insecticide DDT, particularly for sensitive species such as raptors. Herbicides proposed for use by FWP are known to be rapidly metabolized and excreted by mammals. Glyphosate and picloram do not bio-accumulate in fish and animals (US EPA 1983, 1986, 1988; USDA Forest Service 1984). No evidence was found in the literature to support adverse bio-accumulation problems from any herbicides proposed for use by FWP.

Other Treatments

The use of tillage or livestock grazing could impact available forage and habitat for wildlife species. Monitoring grazing livestock would mitigate any negative impacts to vegetation.

4.6 Fisheries

Herbicide Treatments

The potential for herbicides to contact surface water sources is very low. Accidental spills or drift during application could occur that would allow herbicides to contact surface water sources. The risk of accidental spills will be minimized by using properly trained personnel and maintaining procedures and equipment for emergency spill response. Herbicide drift will be mitigated by not applying herbicides in winds greater than 10 mph. In addition, the 10 foot buffer zone established near all surface and shallow ground water sites will further protect fisheries from inadvertent exposure to herbicides.

Acute impacts on fisheries could occur if in-stream concentrations of herbicides exceed levels that are toxic to resident fish. This is extremely unlikely under these management alternatives due to the small quantities available to be spilled and the tremendous dilution potential of most surface water bodies. Chronic and food-chain impacts could occur if in-stream levels become sufficiently elevated for long enough to allow accumulation. This is also unlikely due to the short duration of applications.

Herbicide toxicity to fish and aquatic life varies depending upon the chemical, the fish species and the environmental factors. Chemical herbicides will not be used in riparian areas or near water bodies.

Other Treatments

The use of tillage for seed-bed preparation and livestock grazing for weed control would increase the potential for erosion and reduce water quality. Other methods would have no impact on fisheries.

4.7 Human Health

Herbicide Treatments

Human health risks associated with herbicides used for noxious weed control have been documented in “Analysis of Human Health Risks of USDA Forest Service Use of Herbicides to Control Noxious Weeds in the Northern Region (Monnig 1986). Conclusions in this report indicate that even when consideration is given to mixing errors and a variety of accident scenarios (e.g. spills, leaks, etc.) the “no observable effect levels” (NOEL) for human health are not exceeded. Health impacts to the general public are related either to direct contact with herbicides through spray drift, spills, and sprayed vegetation or to indirect contact through consumption of contaminated water, vegetables, fish, and grazing animals. The most serious human health risk is to herbicide applicators. However, worker doses are likely to be below the Acceptable Daily Intake (ADI) if reasonable safety precautions on the herbicide label are used.

There is the possibility of idiosyncratic responses such as hypersensitivity on the part of a small percentage of the population. These persons are generally aware of their sensitivities since they are typically triggered by a variety of natural and synthetic compounds. Placing signs in high public use areas during and following herbicide applications, and not allowing chemically sensitive persons (volunteers or FWP employees) to work with herbicides should limit exposure.

A definitive evaluation of health effects from pesticides is beyond the scope of this plan. Chronic and acute health effects of chemical pesticides have been determined for all herbicides proposed for use on land managed by FWP Region 4. Our discussion of health effects includes a brief discussion of toxicity, carcinogenicity (cancer) and mutagenicity (birth defects).

Pesticide Toxicity

Toxicity tests are used as standard reference experiments to evaluate potential harm to mammals and other organisms. Toxicity tests on mammals are segregated into acute, subchronic and chronic categories based on the length of exposure to the pesticide. Acute tests evaluate the effects of large dosages in a short time period. Observations are conducted over a span of days to weeks. The most often referred to indices for pesticide toxicity is the median lethal dose (LD50) and the medial lethal concentration (MC50). This is defined as the dose or concentration which is lethal to 50 percent of the treated population (expressed in milligrams of compound ingested per kilogram of body weight). Various rating systems are used to discuss relative toxicity's of pesticides. The US Environmental Protection Agency (EPA) has category guidelines for acute and subchronic toxicity which are used on pesticide labels (Table 4-2). Labels are required under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA).

Table 4-2. TOXICITY RATINGS FOR ACUTE ORAL DOSES IN HUMANS*

<u>Toxicity rating</u>	<u>Classification</u>	<u>EPA Category</u>	<u>EPA Signal Wording</u>	<u>LD50 (mg/kg)</u>	<u>Probable lethal oral dose for Average Adult human</u>
1	Super Toxic	I	Danger - Poison	< 5	7 drops
2	Extremely Toxic	I	Danger- Poison	5 to 49	7 drops to 1 tsp.
3	Very Toxic	II	Warning	50 to 499	1 tsp to 1 oz.
4	Moderately Toxic	III	Caution	500 to 4999	1 oz. to 1 pint
5	Slightly Toxic	none	None	5000 to 14999	1 pint to 1 quart
6	Practically non-toxic	none	None	> 15000	> 1 quart

* From USDA Agriculture Handbook 633

Table 4-3 illustrates the relative toxicity of herbicides proposed for use by FWP compared to other reference substances. Note that many of these pesticides are rated less toxic than table salt and aspirin according to the standardized tests. Comparison with Table 4-2 reveals that the herbicides proposed for use by FWP are slightly to moderately toxic. This does not guarantee that their total health effect is benign but may illustrate relative risk.

Table 4-3. TOXICITY OF COMMON PESTICIDES AND REFERENCE MATERIALS

<u>CHEMICAL (TRADE NAME)</u>	<u>USE</u>	<u>ACUTE ORAL RAT LD50* mg/kg body wt</u>	<u>ORAL HUMAN LD50***</u>
FOSIMINE** (KRENITE)	Broadleaf herbicide	>5000	>0.7 lb
PICLORAM** (TORDON)	Broadleaf herbicide w/ residual	8200	.3 -.6 lb.
2-4,D**	Broadleaf herbicide	300-1000 formulation	.05 lb.
CLOPYRALID** (CURTAIL, TRANSLINE)	Broadleaf herbicide	>5000	>0.7 lb.
DICAMBA ** (BANVEL)	Broadleaf herbicide	1707	.27 lb.
ESCORT** (METSULFURON)	Broadleaf herbicide	>5000	>0.7
GLYPHOSATE** (ROUNDUP) (RODEO)	Non-selective herbicide	5400 >5000	.8 lb.
ASPIRIN	Pain reliever (willow extract)	1000-2000	.15 -.3 lb.
SODIUM CHLORIDE (TABLE SALT)	Condiment	4000-5000	.6 -.8 lb.

* Lethal dose in mg/kg of body weight for 50% of the test animals (rats) - the lower the number the more toxic the substance. from WSSA Herbicide Handbook 1989.

** Pesticides currently proposed for use by FWP Region 4.

*** Estimated lethal dose in POUNDS for a 150 Pound person - estimated from male rat data using a conversion factor for mg/kg to lbs/150 lbs of .00015018. These numbers are not precise but provide a relative idea of lethal doses.

Carcinogenicity and Mutagenicity : Chronic impact studies expose a test subject to a pesticide for a majority of its life span to determine the effects of long-term, low-level exposure. The potential for mutagenicity and carcinogenicity is evaluated. These tests are very complex in relation to human biological systems and potential influences. Table 4-4 illustrates activities needed to increase an average person's risk of cancer by one-in-one million based on current studies.

TABLE 4-4. GENERALIZED SUMMARY OF ENVIRONMENTAL INFLUENCES WHICH INCREASE CANCER DEATH RISK BY ONE IN ONE MILLION. *

SOURCE OF RISK	AMOUNT OF EXPOSURE
Herbicide worker spraying:	2,4-D 137 days. picloram (Tordon): 11,236 Days. glyphosate (Roundup): 41,667 days.
Cosmic rays:	One transcontinental airline round trip. Living 1.5 months in Colorado. Camping at 15,000 ft for 6 days.
Eating and drinking:	40 diet sodas (saccharin). 6 lbs of peanut butter (aflatoxin). 90 Qts. of milk (aflatoxin).
Other:	Smoking two Cigarettes. living 2.5 months in a masonry rather than a wood house. 1/7 of a chest X-ray using modern equipment.

* FROM: 1989. USFS Lolo National Forest. Draft Environmental Impact Statement, Weed Management Plan.

Current data suggest that health risks from herbicides can be significant for sensitive individuals. At the same time, it seems theoretically possible to reduce herbicide risks to levels equivalent to, or well below other common risks. This is accomplished by proper storage, use and disposal, and minimizing exposure including the use of protective clothing as listed on the product label.

Human health risks will be minimized by posting signs at FWP sites when herbicides are used. Visitors will have the choice of exposure during and following application periods. All applications will be made by trained personnel with proper protective equipment.

Other Treatment Methods

Mechanical, manual, and cultural weed treatment methods, such as fertilizing, mowing, tilling, and hand pulling subject workers to heavy machinery, skin irritants, and general hazards associated with field work. Operators of mowing machines, tillers, or other heavy machinery are prone to injury through accidents or contact with flying debris or brush. Hand pulling can expose workers to hazards such as poisonous snakes or substances in plants that cause blisters, inflammation, or dermatitis.

The integrated management approach includes aspects of some or all of the weed control methods. As a consequence, the impact to human health are equal to or somewhat less than those described for both manual/mechanical, cultural, and chemical methods.

4.8 Cumulative Effects

Control activities on all FWP properties must be considered in a cumulative manner to assess potential impacts from the total weed management program. Efforts on FWP properties must also be considered in addition to the efforts of other agencies and private parties. The potential cumulative impacts on FWP properties and adjacent lands resulting from herbicide use should not be significant since only a limited number of sites will be treated each year and these will be spread over a very large geographic area including multiple drainage basins.

Other weed management activities will be conducted by county weed boards, the state highway department, other state and federal agencies and private landowners. The cumulative effects of these activities should not result in the irreversible commitment of resources or significant negative environmental impacts if label instructions and proper procedures are followed.

5.0 PUBLIC INVOLVEMENT

Public comment will be a 30 day period after announcement of this draft EA. A public meeting will be held in the middle of the proposed public comment period to allow interested individuals ample opportunity to write in comments and concerns. The EA was compiled after review of public input on other recent, local weed management plans and EAs. Public comment will be solicited through media advertisements, the State Electronic Bulletin Board and direct mailings to groups and individuals who have expressed an interest in these issues.

Newspapers advertising include:

- Great Falls Tribune
- Lewistown New-Argus
- Choteau Acantha
- Havre Daily News
- Helena Independent-Record
- Meagher County News
- Judith Basin Press
- Sun Times-Fairfield
- A general news release

6.0. SUMMARY

This environmental assessment allows for comparison of weed management options on subject lands in FWP Region 4. In combination with agency and public review, this information will be used to select and refine a final weed management alternative for implementation. The final choice of a weed management plan will be announced in a Record of Decision (ROD) issues by the supervisor of FWP Region 4. This ROD should be completed in early June 1997.

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APPENDIX A

GIANT SPRINGS STATE PARK

Location: 282 acres site, 1 mile ne. of Great Falls on south side of Missouri River, T. R. Sections 5 and 6, T. R. Section 33, 34 and 35 (including easement), on Northeast Great Falls Quad (4711152).

General Description: The site spans app. a 4 mile long segment of Missouri River bluffs, valley slopes, and bordering uplands along the impounded river valley (fee title and easement).

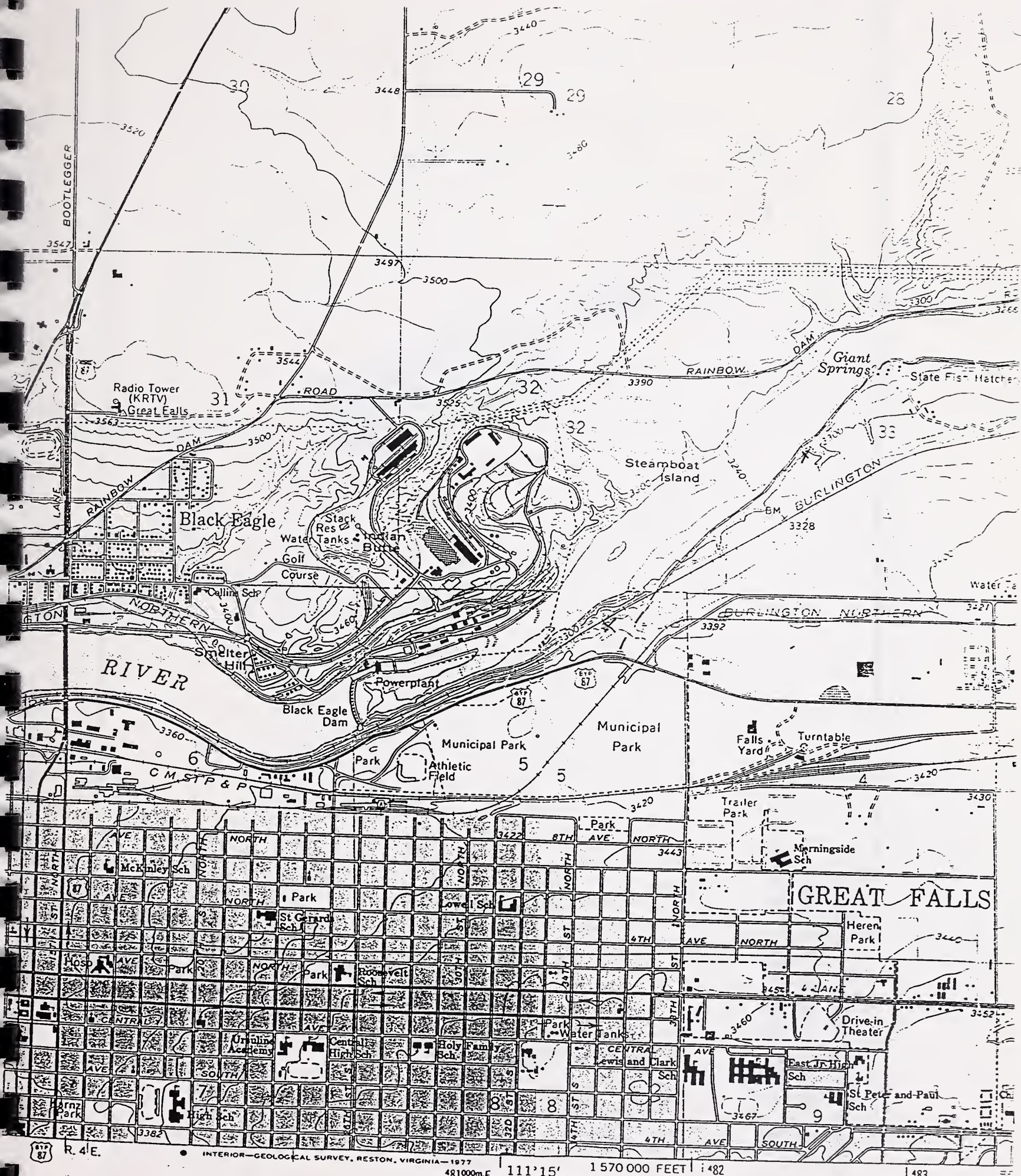
Biodiversity comments: White four o'clock (*Mirabilis albida*) was collected on dry Missouri River bluffs. Verification was provided by taxonomists at the University of Kansas who authored the genus treatment in Flora of the Great Plains (Great Plains Flora Association 1986). In this reference it is called a tentative taxonomic treatment, and will be revisited in upcoming work on the Flora of North America. This species has not been documented before in Montana, though it is known from other Great Plains states and provinces. It is being considered for addition to the Montana Plant Species of Special Concern list with state rank = "status undetermined" pending specimen review and further taxonomic consultation. The sensitive plant survey form for it is provided as interim documentation (attached) pending entry into the Biological Conservation Database (BCD).

No other species or plant community occurrences were documented. The work on vascular species augmented the floristic information compiled over repeated visits by Wayne Phillips. It may not have covered all of the late-season flora, and did not systematically treat the submerged aquatic plants. In addition, Joe Elliott compiled a preliminary moss checklist for the Park as part of this study (attached).

The landscape has been profoundly altered by many land uses (farming, grazing, smelting, recreation development) and associated degradation. Yet the degradation is incremental and patchy, and much of the attraction in the park lies in its natural features or semblance.

Management comments: Noxious weeds include leafy spurge (*Euphorbia esula*) along the river. Many exotic species are common to locally dominant in the Park, including poison hemlock (*Conium maculatum*) growing at the margin of Giant Spring.

Photo documentary: *Mirabilis albida* habitat



ROAD CLASSIFICATION

Heavy-duty ——— Light-duty ———

Medium-duty ——— Unimproved dirt ———

Interstate Route U.S. Route

Mapped, edited, and published by the Geological Survey

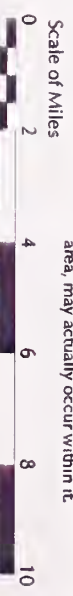
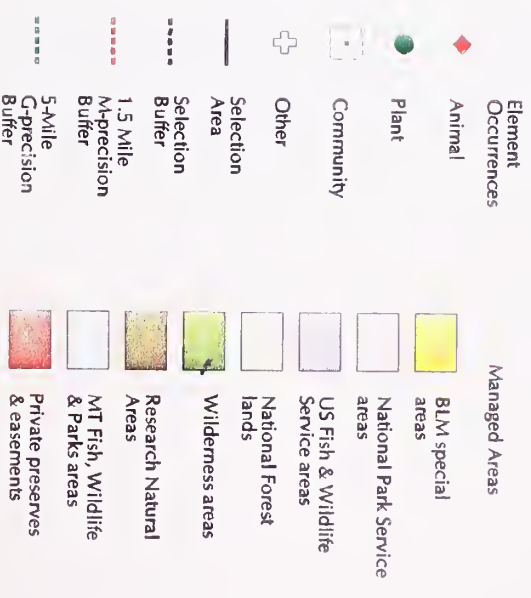
Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1964. Field checked 1965

Polyconic projection. 1927 North American datum
10,000-foot grid based on Montana coordinate system.

STANFORD

Species of Special Concern Search Area: Freezeout Lake Wildlife Management Area



Not all legend items may occur on map.
"Precision" buffers are designed to capture those records that, though mapped outside the selection area, may actually occur within it.

October 31, 1996

October 31, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Freezeout Lake Wildlife Management Area

Scientific Name: NYCTICORAX NYCTICORAX
Common Name: BLACK-CROWNED NIGHT-HERON

Global rank: G5 Forest Service status:
State rank: S2S3B,SZN Federal Status:

Element occurrence code: ABNGA11010.003
Element occurrence type:

Survey site name: FREEZEOUT LAKE
EO rank:
EO rank comments:

County: TETON

USGS quadrangle: FREEZEOUT LAKE

Township: Range: Section: TRS comments:
022N 003W 20

Precision: M
Survey date: Elevation: 3765 -
First observation: 1985-05 Slope/aspect:
Last observation: 1995 06 02 Size (acres):

Location:
FREEZEOUT LAKE IS WEST OF US 89 CA. 4 MILES NORTH OF FAIRFIELD.

Element occurrence data:
NO POPULATION ESTIMATES. BIRDS OBSERVED ON NUMEROUS OCCASIONS.
ADDITIONAL INFORMATION AVAILABLE FROM MTHP.

General site description:
MAIN LAKE BELOW POND NO. 6.

Land owner/manager:
FREEZEOUT LAKE WILDLIFE MANAGEMENT AREA

Comments:

Information source: MONTANA NATURAL HERITAGE PROGRAM. ["MBD" (MONTANA
BIRD DISTRIBUTION) DATABASE OF BIRD OBSERVATIONS
COMPILED FROM MANY SOURCES, WITH LOCATION AND
ASSOCIATED DATA MAINTAINED IN DBASE III+.] CREATED
APRIL, 1991 WITH ONGOING UPDATES.

Specimens:

October 31, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Freezeout Lake Wildlife Management Area

Scientific Name: BIRD ROOKERY

Common Name: BIRD ROOKERY

Global rank: Z Forest Service status:

State rank: Z Federal Status:

Element occurrence code: OROOKERY//.081

Element occurrence type:

Survey site name: FREEZEOUT LAKE

EO rank:

EO rank comments:

County: TETON

USGS quadrangle: FREEZEOUT LAKE

Township: Range: Section: TRS comments:

022N 003W 19 SE4

Precision: S

Survey date:

Elevation: 3760 -

First observation: 1990

Slope/aspect:

Last observation: 1990-07-06

Size (acres):

Location:

FREEZEOUT LAKE IS WEST OF US 89 CA. 4 MILES NORTH OF FAIRFIELD.

Element occurrence data:

DOUBLE-CRESTED CORMORANT. CA. 60 NESTS, CA. 110 YOUNG OBSERVED, PLUS
SEVERAL NESTS WITH EGGS AND HATCHLINGS.

General site description:

ALKALI FLAT AT SOUTH END OF PENINSULA IN THE MAIN LAKE.

Land owner/manager:

FREEZEOUT LAKE WILDLIFE MANAGEMENT AREA

Comments:

ROOKERY PROTECTED BY ELECTRIC FENCE (ACROSS PENINSULA TO THE NORTH),
PLACED TO PROTECT UPLAND DUCK NESTING.

Information source: JONES, CEDRON. MONTANA NATURAL HERITAGE PROGRAM,
1515 EAST SIXTH AVENUE, P.O. BOX 201800, HELENA,
MT 59620-1800.

Specimens:

October 31, 1996

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MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Freezeout Lake Wildlife Management Area

Scientific Name: CHLIDONIAS NIGER
Common Name: BLACK TERN

Global rank: G4 Forest Service status:
State rank: S3B,SZN Federal Status:

Element occurrence code: ABNNM10020.008
Element occurrence type:

Survey site name: FREEZEOUT LAKE
EO rank:
EO rank comments:

County: TETON

USGS quadrangle: FREEZEOUT LAKE

Township: Range: Section: TRS comments:
022N 003W 20

Precision: M
Survey date: 1995-06-02 Elevation: 3765 -
First observation: 1989 Slope/aspect:
Last observation: 1995-06-02 Size (acres):

Location:
FREEZEOUT LAKE IS WEST OF US 89 CA. 4 MILES NORTH OF FAIRFIELD.

Element occurrence data:
1995: AT LEAST 50 ADULTS PRESENT. ADDITIONAL INFORMATION AVAILABLE
FROM MTHP.

General site description:
MAIN LAKE BELOW POND NO. 6.

Land owner/manager:
FREEZEOUT LAKE WILDLIFE MANAGEMENT AREA

Comments:

Information source: MONTANA NATURAL HERITAGE PROGRAM. ["MBD" (MONTANA
BIRD DISTRIBUTION) DATABASE OF BIRD OBSERVATIONS
COMPILED FROM MANY SOURCES, WITH LOCATION AND
ASSOCIATED DATA MAINTAINED IN DBASE III+.] CREATED
APRIL, 1991 WITH ONGOING UPDATES.

Specimens:

October 31, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Freezeout Lake Wildlife Management Area

Scientific Name: DOWNINGIA LAETA
Common Name: GREAT BASIN DOWNINGIA

Global rank: G5 Forest Service status:
State rank: S1 Federal Status:

Element occurrence code: PDCAM06080.005
Element occurrence type:

Survey site name: FREEZEOUT LAKE
EO rank:
EO rank comments:

County: TETON

USGS quadrangle: FREEZEOUT LAKE

Township: Range: Section: TRS comments:
022N 003W 18

Precision: G
Survey date: Elevation: 3771 -
First observation: 1943 Slope/aspect:
Last observation: 1943-07-07 Size (acres): 0

Location:
FREEZEOUT LAKE (CA. 15 MILES SOUTHEAST OF CHOTEAU).

Element occurrence data:
IN FRUIT (7 JULY 1943).

General site description:
IN SHALLOW WATER UNDER AGROPYRON AND ELEOCHARIS.

Land owner/manager:
FREEZEOUT LAKE WILDLIFE MANAGEMENT AREA

Comments:
NONE.

Information source: BOTANIST, MONTANA NATURAL HERITAGE PROGRAM, 1515
EAST SIXTH AVENUE, HELENA, MT 59620-1800.

Specimens: HOTCHKISS, N. (6836). 1943. MONT. (MRPP CARD).

October 31, 1996

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MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Freezeout Lake Wildlife Management Area

Scientific Name: HIMANTOPUS MEXICANUS
Common Name: BLACK-NECKED STILT

Global rank: G5 Forest Service status:
State rank: S2B,SZN Federal Status:

Element occurrence code: ABNND01010.001
Element occurrence type:

Survey site name: FREEZEOUT LAKE
EO rank:
EO rank comments:

County: TETON

USGS quadrangle: FREEZEOUT LAKE

Township: Range: Section: TRS comments:
022N 003W 7 SW4

Precision: M
Survey date: Elevation: 3773 -
First observation: 1989 Slope/aspect:
Last observation: 1995-06-02 Size (acres):

Location:
FREEZEOUT LAKE IS WEST OF US 89 CA. 4 MILES NORTH OF FAIRFIELD.

Element occurrence data:
BIRDS OBSERVED ON SEVERAL OCCASIONS. ADDITIONAL INFORMATION AVAILABLE
FROM MTHP.

General site description:
ALKALI FLAT BETWEEN MAIN LAKE AND POND NO. 5.

Land owner/manager:
FREEZEOUT LAKE WILDLIFE MANAGEMENT AREA

Comments:

Information source: MONTANA NATURAL HERITAGE PROGRAM. ["MBD" (MONTANA
BIRD DISTRIBUTION) DATABASE OF BIRD OBSERVATIONS
COMPILED FROM MANY SOURCES, WITH LOCATION AND
ASSOCIATED DATA MAINTAINED IN DBASE III+.] CREATED
APRIL, 1991 WITH ONGOING UPDATES.

Specimens:

October 31, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Freezeout Lake Wildlife Management Area

Scientific Name: STERNA FORSTERI
Common Name: FORSTER'S TERN

Global rank: G5 Forest Service status:
State rank: S2B,SZN Federal Status:

Element occurrence code: ABNNM08090.005
Element occurrence type:

Survey site name: FREEZEOUT LAKE
EO rank:
EO rank comments:

County: TETON

USGS quadrangle: FREEZEOUT LAKE

Township: Range: Section: TRS comments:
022N 003W 20

Precision: M
Survey date: Elevation: 3765 -
First observation: 1991 Slope/aspect:
Last observation: 1995-06-02 Size (acres):

Location:
FREEZEOUT LAKE IS WEST OF US 89 CA. 4 MILES NORTH OF FAIRFIELD.

Element occurrence data:
1995: APPROXIMATELY 12 PAIRS BREEDING (4 NESTS SEEN) ON 1-2 JUNE (M.
SCHWITTERS); PRE-1995: BIRDS OBSERVED ON SEVERAL OCCASIONS. ADDITIONAL
INFORMATION AVAILABLE FROM MTHP.

General site description:
ISLAND IN MAIN LAKE BELOW POND NO. 6 AND EAST OF LOWER PENINSULA.

Land owner/manager:
FREEZEOUT LAKE WILDLIFE MANAGEMENT AREA

Comments:

Information source: MONTANA NATURAL HERITAGE PROGRAM. ["MBD" (MONTANA
BIRD DISTRIBUTION) DATABASE OF BIRD OBSERVATIONS
COMPILED FROM MANY SOURCES, WITH LOCATION AND
ASSOCIATED DATA MAINTAINED IN DBASE III+.] CREATED
APRIL, 1991 WITH ONGOING UPDATES.

Specimens:

October 31, 1996

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MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Freezeout Lake Wildlife Management Area

Scientific Name: AECHMOPHORUS CLARKII
Common Name: CLARK'S GREBE

Global rank: G5 Forest Service status:
State rank: S2S4B,SZN Federal Status:

Element occurrence code: ABNCA04020.001
Element occurrence type:

Survey site name: FREEZEOUT LAKE
EO rank:
EO rank comments:

County: TETON

USGS quadrangle: FREEZEOUT LAKE

Township: Range: Section: TRS comments:
022N 003W 20

Precision: M
Survey date: Elevation: 3765 -
First observation: 1990-05 Slope/aspect:
Last observation: 1993-05-16 Size (acres):

Location:
FREEZEOUT LAKE IS WEST OF US 89 CA. 4 MILES NORTH OF FAIRFIELD.

Element occurrence data:
1993: BUILDING NEST ON 5/16, 3 YOUNG ON 7/11. BIRDS OBSERVED BREEDING
AND PROBABLY BREEDING ON VARIOUS DATES. NO POPULATION INFORMATION.
ADDITIONAL INFORMATION AVAILABLE FROM MTHP.

General site description:
MAIN LAKE BELOW POND NO. 6.

Land owner/manager:
FREEZEOUT LAKE WILDLIFE MANAGEMENT AREA

Comments:

Information source: MONTANA NATURAL HERITAGE PROGRAM. ["MBD" (MONTANA
BIRD DISTRIBUTION) DATABASE OF BIRD OBSERVATIONS
COMPILED FROM MANY SOURCES, WITH LOCATION AND
ASSOCIATED DATA MAINTAINED IN DBASE III+.] CREATED
APRIL, 1991 WITH ONGOING UPDATES.

Specimens:

October 31, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Freezeout Lake Wildlife Management Area

Scientific Name: AMMODRAMUS BAIRDII
Common Name: BAIRD'S SPARROW

Global rank: G3G4 Forest Service status:
State rank: S3S4B,SZN Federal Status:

Element occurrence code: ABPBXA0010.002
Element occurrence type:

Survey site name: FREEZEOUT LAKE
EO rank:
EO rank comments:

County: TETON

USGS quadrangle: FREEZEOUT LAKE

Township: Range: Section: TRS comments:
022N 003W 29 CENTER

Precision: M
Survey date: Elevation: 3770 -
First observation: 1993-06 Slope/aspect:
Last observation: 1994-06 Size (acres):

Location:
SOUTH END OF FREEZEOUT LAKE, CA. 2 AIR MILES NORTHWEST OF FAIRFIELD.

Element occurrence data:
LATE JUNE 1994: 1 MALE HEARD SINGING. LATE JUNE-JULY 1993: 3-5 MALES
HEARD SINGING.

General site description:
GRASSLANDS.

Land owner/manager:
FREEZEOUT LAKE WILDLIFE MANAGEMENT AREA

Comments:
SOURCE: MIKE SCHWITTERS, PERSONAL COMMUNICATION.

Information source: ZOOLOGIST, MONTANA NATURAL HERITAGE PROGRAM, 1515
EAST SIXTH AVENUE, P.O. BOX 210800, HELENA, MT
59620-1800. 406/444-3009.

Specimens:

October 31, 1996

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MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Freezeout Lake Wildlife Management Area

Scientific Name: LARUS PIPIXCAN
Common Name: FRANKLIN'S GULL

Global rank: G5 Forest Service status:
State rank: S3B,SZN Federal Status:

Element occurrence code: ABNNM03020.005
Element occurrence type:

Survey site name: FREEZEOUT LAKE
EO rank:
EO rank comments:

County: TETON

USGS quadrangle: FREEZEOUT LAKE

Township: Range: Section: TRS comments:
022N 003W 20

Precision: M
Survey date: 1995-06-02 Elevation: 3765 -
First observation: 1958-04 Slope/aspect:
Last observation: 1995-06-02 Size (acres):

Location:
FREEZEOUT LAKE IS WEST OF US 89 CA. 4 MILES NORTH OF FAIRFIELD.

Element occurrence data:
1995: SEVERAL HUNDRED NESTING IN BULRUSHES. 1994: 500-5000; PRE 1994:
18,000; 1958: ON 10 SAMPLE PLOTS (0.1 AC) 5-111 NESTS WERE FOUND; NO
POPULATION ESTIMATE WAS MADE. BIRDS OBSERVED ON NUMEROUS OCCASIONS.
ADDITIONAL INFORMATION AVAILABLE FROM MTHP.

General site description:
MAIN LAKE BELOW POND NO. 6.

Land owner/manager:
FREEZEOUT LAKE WILDLIFE MANAGEMENT AREA

Comments:

Information source: MONTANA NATURAL HERITAGE PROGRAM. ["MBD" (MONTANA
BIRD DISTRIBUTION) DATABASE OF BIRD OBSERVATIONS
COMPILED FROM MANY SOURCES, WITH LOCATION AND
ASSOCIATED DATA MAINTAINED IN DBASE III+.] CREATED
APRIL, 1991 WITH ONGOING UPDATES.

Specimens:

October 31, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Freezeout Lake Wildlife Management Area

Scientific Name: STERNA HIRUNDO
Common Name: COMMON TERN

Global rank: G5 Forest Service status:
State rank: S3B,SZN Federal Status:

Element occurrence code: ABNNM08070.001
Element occurrence type:

Survey site name: FREEZEOUT LAKE
EO rank:
EO rank comments:

County: TETON

USGS quadrangle: FREEZEOUT LAKE

Township: Range: Section: TRS comments:
023N 004W 25 6; 7

Precision: M
Survey date: Elevation: 3770 -
First observation: 1959 Slope/aspect:
Last observation: 1995-06-02 Size (acres):

Location:
FREEZEOUT LAKE IS WEST OF US 89 CA. 4 MILES NORTH OF FAIRFIELD.

Element occurrence data:
1995: 110-120 NESTS ON 1-2 JUNE (M. SCHWITTERS); 1991: CONFIRMED
BREEDING.

General site description:
ISLANDS ON POND NO. 1, POND 2, POND 3, POND 5, AND SOUTHERN END OF
FREEZEOUT LAKE. SOME NESTING WITH FRANKLIN'S GULLS.

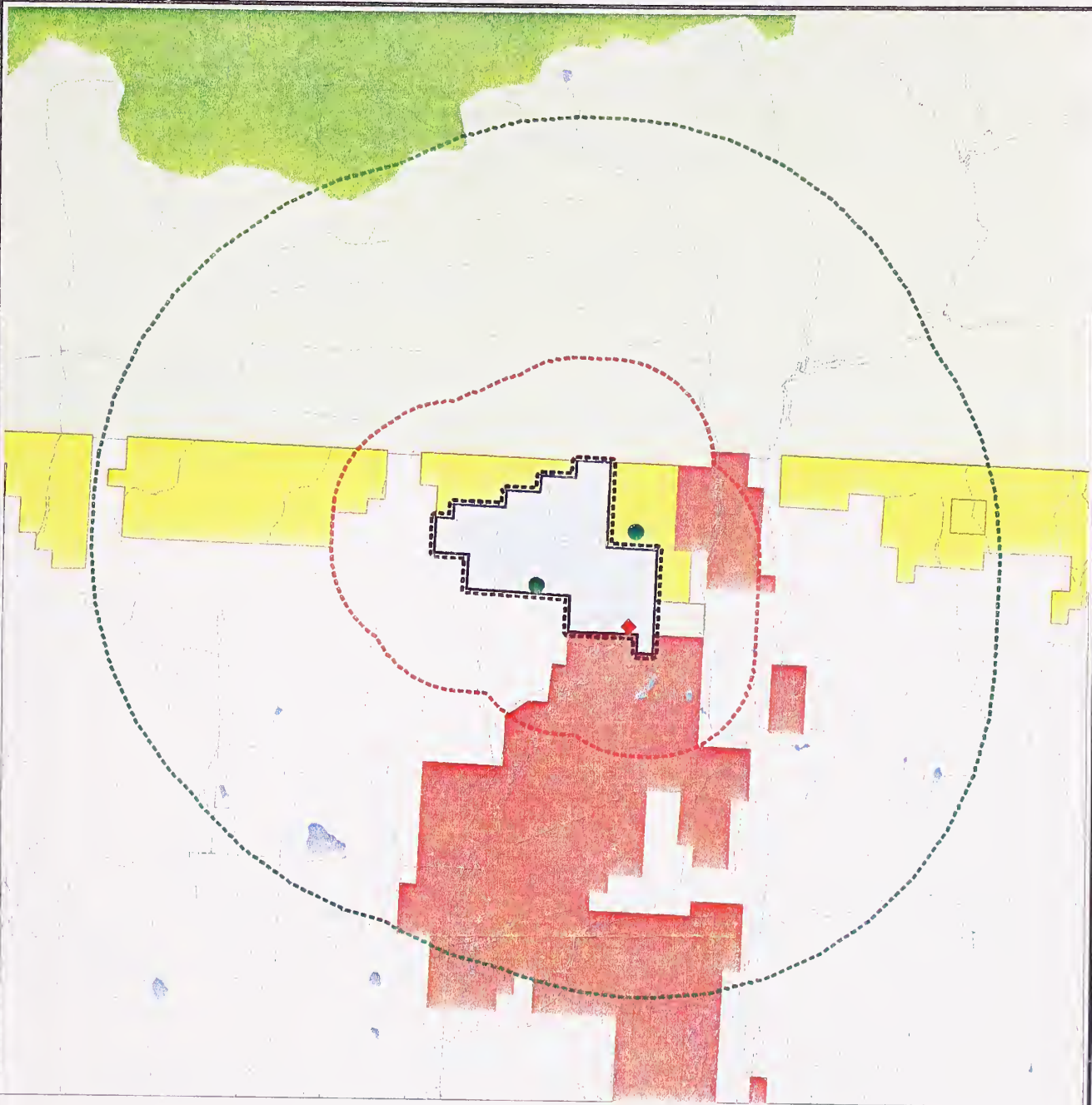
Land owner/manager:
FREEZEOUT LAKE WILDLIFE MANAGEMENT AREA

Comments:
OBSERVED MAY 1991 AND IN 1995 BY M. SCHWITTERS AND IN 1991 BY D.
SULLIVAN.

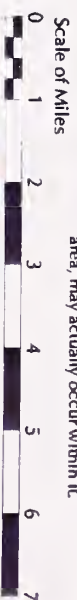
Information source: MONTANA NATURAL HERITAGE PROGRAM. ["MBD" (MONTANA
BIRD DISTRIBUTION) DATABASE OF BIRD OBSERVATIONS
COMPILED FROM MANY SOURCES, WITH LOCATION AND
ASSOCIATED DATA MAINTAINED IN DBASE III+.] CREATED
APRIL, 1991 WITH ONGOING UPDATES.

Specimens:

Species of Special Concern Search Area: Ear Mountain Wildlife Management Area



- | Element Occurrences | Managed Areas |
|-----------------------------|----------------------------------|
| Animal | BLM special areas |
| Plant | National Park Service areas |
| Community | US Fish & Wildlife Service areas |
| Other | National Forest lands |
| Selection Area | Wilderness areas |
| Selection Buffer | Research Natural Areas |
| 1.5 Mile M-precision Buffer | MT Fish, Wildlife & Parks areas |
| 5-Mile G-precision Buffer | Private preserves & easements |



Not all legend items may occur on map.
"Precision" buffers are designed to capture those records that, though mapped outside the selection area, may actually occur within it.

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MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Ear Mountain Wildlife Management Area

Scientific Name: URSUS ARCTOS HORRIBILIS
Common Name: GRIZZLY BEAR

Global rank: G4T3 Forest Service status: THREATENED
State rank: S1S2 Federal Status: LTNL

Element occurrence code: AMAJB01021.008
Element occurrence type:

Survey site name: NORTHERN CONTINENTAL DIVIDE
EO rank:
EO rank comments:

County: FLATHEAD
GLACIER
PONDERA
TETON
LEWIS AND CLARK
POWELL
MISSOULA
LAKE

USGS quadrangle:

Township: Range: Section: TRS comments:

Precision: U
Survey date: Elevation: 3200 - 10400
First observation: Slope/aspect:
Last observation: Size (acres):

Location:
THIS RECORD ENCOMPASSES AN AREA FROM CANADA SOUTH TO STATE HIGHWAY
200, AND FROM EAST FRONT TO SWAN AND STILLWATER RIVERS.

Element occurrence data:
OCCUPIED HABITAT. THIS OCCURRENCE IS APPARENTLY SEPARATED FROM THAT IN
THE MISSION MOUNTAINS TO THE EAST AND BECOMING ISOLATED FROM
POPULATIONS IN CANADA TO THE NORTH. THE POPULATION IS ESTIMATED AT
549-813 BEARS WITH A MINIMUM OF 306 BEARS (INCLUDING THE MISSION
MOUNTAINS PORTION), ACCORDING TO THE U.S. FISH AND WILDLIFE SERVICE.
FROM 1987-1992, THE AVERAGE KNOWN HUMAN-CAUSED MORTALITY WAS 11.3
BEARS/YEAR, ACCORDING TO THE U.S. FISH AND WILDLIFE SERVICE.

General site description:
GRIZZLIES USE A WIDE RANGE OF HABITATS, FROM LOW-ELEVATION RIPARIAN
AREAS TO ALPINE AND TALUS SLOPES.

Land owner/manager:
SCAPEGOT WILDERNESS
BOB MARSHALL WILDERNESS
GREAT BEAR WILDERNESS
GLACIER NATIONAL PARK
FLATHEAD NATIONAL FOREST
LEWIS & CLARK NATIONAL FOREST
HELENA NATIONAL FOREST
LOLO NATIONAL FOREST
CORPORATE TIMBERLANDS
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)
STATE LAND - UNDESIGNATED

October 31, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Ear Mountain Wildlife Management Area

Comments:

THIS RECORD IS BASED ON THE NORTHERN CONTINENTAL DIVIDE ECOSYSTEM RECOVERY ZONE BOUNDARY. MTHP TRACKS OCCUPIED GRIZZLY HABITAT BY 7.5 USGS QUADS; THIS RECORD ENCOMPASSES CA. 200 QUADS. BOUNDARIES, WITH INCLUDED QUADS, ARE AVAILABLE IN G.I.S.).

Information source: SERVHEEN, C. 1993. GRIZZLY BEAR RECOVERY PLAN. UNPUBLISHED REPORT TO THE U.S. FWS. UNIVERSITY OF MONTANA, MISSOULA. 181 PP.

Specimens:

October 31, 1996

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MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Ear Mountain Wildlife Management Area

Scientific Name: ONCORHYNCHUS CLARKI LEWISI
Common Name: WESTSLOPE CUTTHROAT TROUT

Global rank: G4T3 Forest Service status: SENSITIVE
State rank: S3 Federal Status:

Element occurrence code: AFCHA02088.115
Element occurrence type:

Survey site name: NORTH FORK WILLOW CREEK (RMF)
EO rank:
EO rank comments:

County: TETON

USGS quadrangle: EAR MOUNTAIN

Township: Range: Section: TRS comments:
024N 008W 09

Precision: M
Survey date: Elevation: 5100 -
First observation: 1990 Slope/aspect:
Last observation: 1990-08 Size (acres):

Location:
FROM CHOTEAU, DRIVE WEST ON COUNTY ROAD CA. 15 MILES TO EAR MOUNTAIN
WILDLIFE MANAGEMENT AREA, THEN WALK NORTH CA. 1 MILE TO NORTH FORK
WILLOW CREEK.

Element occurrence data:
SAMPLE OF 22 FISH TESTED GENETICALLY PURE BY ELECTROPHORESIS.

General site description:
STREAM SEGMENT WITH RESIDENT POPULATION.

Land owner/manager:
EAR MOUNTAIN WILDLIFE MANAGEMENT AREA
PINE BUTTE SWAMP PRESERVE

Comments:
LOCATION MAPPED IS APPROXIMATE COLLECTION SITE.

Information source: LEARY, R. F. 1990. [LETTER OF 2 OCTOBER TO BILL
HILL, MDFWP, RE: GENETIC ANALYSIS OF TROUT SAMPLES
FROM ROCKY MTN FRONT AREA.]

Specimens:

October 31, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Ear Mountain Wildlife Management Area

Scientific Name: POLYGONUM POLYGALOIDES
Common Name: WHITE-MARGINED KNOTWEED

Global rank: G4G5 Forest Service status:
State rank: S2 Federal Status:

Element occurrence code: PDPGN0L1Y0.003
Element occurrence type:

Survey site name: NORTH FORK WILLOW CREEK
EO rank:
EO rank comments:

County: TETON

USGS quadrangle: EAR MOUNTAIN

Township: Range: Section: TRS comments:
024N 008W 08 7

Precision: M
Survey date: Elevation: 6000 -
First observation: 1982-08-18 Slope/aspect:
Last observation: 1982-08-18 Size (acres):

Location:
1.5 MILES NORTHEAST OF EAR MOUNTAIN, CA. 30 MILES WEST OF CHOTEAU.

Element occurrence data:
COMMON, IN FLOWER.

General site description:
AROUND THE EDGE OF A SMALL POND SITUATED ON RIDGE, WITH PLAGIOBOTHRYIS
SCOULERI.

Land owner/manager:
EAR MOUNTAIN OUTSTANDING NATURAL AREA
BLM: LEWISTOWN DISTRICT, GREAT FALLS RESOURCE AREA

Comments:
HERBARIUM LABEL INDICATES "T24N, R7W, S7." OCCURRENCE MAPPED IN T24N,
R8W, S8 TO CORRESPOND WITH LABEL SITE DESCRIPTION.

Information source: LESICA, PETER. DIVISION OF BIOLOGICAL SCIENCES,
UNIVERSITY OF MONTANA, MISSOULA, MT 59812. PHONE
406/728-8740.

Specimens: LESICA, P. (2420). 1982. MONTU.

October 31, 1996

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MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Ear Mountain Wildlife Management Area

Scientific Name: POLYGONUM DOUGLASII SSP AUSTINAE
Common Name: AUSTIN'S KNOTWEED

Global rank: G5T4 Forest Service status: SENSITIVE
State rank: S2S3 Federal Status:

Element occurrence code: PDPGN0L0X1.011
Element occurrence type:

Survey site name: EAR MOUNTAIN
EO rank: B
EO rank comments: SMALL POPULATION

County: TETON

USGS quadrangle: EAR MOUNTAIN

Township: Range: Section: TRS comments:
024N 008W 17 CENTER, SE4SW4; 7 SE4NW4

Precision: S
Survey date: 1995-08-21 Elevation: 5800 - 5960
First observation: 1995-08-21 Slope/aspect: 10% / WEST
Last observation: 1995-08-21 Size (acres): 1

Location:
CA. 22 AIR MILES WEST OF CHOTEAU, CA. 2.6 AIR MILES SSW OF EAR
MOUNTAIN RANGER STATION. SECTION 7 SUBPOPULATION CAN BE REACHED ON
TRAIL TO YAGER FLAT, AND SECTION 17 SUBPOPULATIONS ARE ON TRAIL INTO
EAR MOUNTAIN GAME RANGE.

Element occurrence data:
3 SUBPOPULATIONS WITH 200-500 PLANTS, FRUITING.

General site description:
DRY, OPEN RESIDUAL MOUNTAIN BENCHES AND RIDGETOPS. SHALE, SANDSTONE
PARENT MATERIAL, GRAVELLY SOIL. ASSOCIATED SPECIES: AGROPYRON
SPICATUM, POTENTILLA FRUTICOSA, P. HIPPIANA, CAREX ROSSII, LUPINUS
WYETHII, DOUGLASIA MONTANA, ERIOGONUM OVALIFOLIUM.

Land owner/manager:
EAR MOUNTAIN WILDLIFE MANAGEMENT AREA
EAR MOUNTAIN OUTSTANDING NATURAL AREA

Comments:

Information source: LESICA, PETER. DIVISION OF BIOLOGICAL SCIENCES,
UNIVERSITY OF MONTANA, MISSOULA, MT 59812. PHONE
406/728-8740.

Specimens: LESICA, P. (7110). 1995. MONTU.

Species of Special Concern Search Area: Blackleaf Wildlife Management Area



- | Element Occurrences | Managed Areas |
|---|---|
| Animal (Red Diamond) | BLM special areas (Yellow) |
| Plant (Green Circle) | National Park Service areas (Purple) |
| Community (Square with dot) | US Fish & Wildlife Service areas (Light Purple) |
| Other (+) | National Forest lands (Light Green) |
| Selection Area (Solid line) | Wilderness areas (Dark Green) |
| Selection Buffer (Dashed line) | Research Natural Areas (Brown) |
| 1.5 Mile M-precision Buffer (Red Dashed line) | MT Fish, Wildlife & Parks areas (Light Blue) |
| 5-Mile G-precision Buffer (Green Dotted line) | Private preserves & easements (Red) |

NOTE: Additional species locations occur in this area but are not displayed due to their sensitive nature.

Not all legend items may occur on map.
"Precision" buffers are designed to capture those records that, though mapped outside the selection area, may actually occur within it.



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MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Blackleaf Wildlife Management Area

Scientific Name: URSUS ARCTOS HORRIBILIS

Common Name: GRIZZLY BEAR

Global rank: G4T3 Forest Service status: THREATENED

State rank: S1S2 Federal Status: LTNL

Element occurrence code: AMAJB01021.008

Element occurrence type:

Survey site name: NORTHERN CONTINENTAL DIVIDE

EO rank:

EO rank comments:

County: FLATHEAD

GLACIER

PONDERA

TETON

LEWIS AND CLARK

POWELL

MISSOULA

LAKE

USGS quadrangle:

Township: Range: Section: TRS comments:

Precision: U

Survey date: Elevation: 3200 - 10400

First observation: Slope/aspect:

Last observation: Size (acres):

Location:

THIS RECORD ENCOMPASSES AN AREA FROM CANADA SOUTH TO STATE HIGHWAY 200, AND FROM EAST FRONT TO SWAN AND STILLWATER RIVERS.

Element occurrence data:

OCCUPIED HABITAT. THIS OCCURRENCE IS APPARENTLY SEPARATED FROM THAT IN THE MISSION MOUNTAINS TO THE EAST AND BECOMING ISOLATED FROM POPULATIONS IN CANADA TO THE NORTH. THE POPULATION IS ESTIMATED AT 549-813 BEARS WITH A MINIMUM OF 306 BEARS (INCLUDING THE MISSION MOUNTAINS PORTION), ACCORDING TO THE U.S. FISH AND WILDLIFE SERVICE. FROM 1987-1992, THE AVERAGE KNOWN HUMAN-CAUSED MORTALITY WAS 11.3 BEARS/YEAR, ACCORDING TO THE U.S. FISH AND WILDLIFE SERVICE.

General site description:

GRIZZLIES USE A WIDE RANGE OF HABITATS, FROM LOW-ELEVATION RIPARIAN AREAS TO ALPINE AND TALUS SLOPES.

Land owner/manager:

SCAPEGOAT WILDERNESS

BOB MARSHALL WILDERNESS

GREAT BEAR WILDERNESS

GLACIER NATIONAL PARK

FLATHEAD NATIONAL FOREST

LEWIS & CLARK NATIONAL FOREST

HELENA NATIONAL FOREST

LOLO NATIONAL FOREST

CORPORATE TIMBERLANDS

PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)

STATE LAND - UNDESIGNATED

October 31, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Blackleaf Wildlife Management Area

Comments:

THIS RECORD IS BASED ON THE NORTHERN CONTINENTAL DIVIDE ECOSYSTEM RECOVERY ZONE BOUNDARY. MTHP TRACKS OCCUPIED GRIZZLY HABITAT BY 7.5 USGS QUADS; THIS RECORD ENCOMPASSES CA. 200 QUADS. BOUNDARIES, WITH INCLUDED QUADS, ARE AVAILABLE IN G.I.S.).

Information source: SERVHEEN, C. 1993. GRIZZLY BEAR RECOVERY PLAN. UNPUBLISHED REPORT TO THE U.S. FWS. UNIVERSITY OF MONTANA, MISSOULA. 181 PP.

Specimens:

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MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Blackleaf Wildlife Management Area

Scientific Name: CAREX PAUPERCULA

Common Name: POOR SEDGE

Global rank: G5 Forest Service status: SENSITIVE

State rank: S2S3 Federal Status:

Element occurrence code: PMCYP03G32.020

Element occurrence type:

Survey site name: ANTELOPE BUTTE BOG

EO rank:

EO rank comments:

County: TETON

USGS quadrangle: CAVE MOUNTAIN

Township: Range: Section: TRS comments:

026N 008W 28 N2

Precision: M

Survey date: Elevation: 4880 -

First observation: 1988-06-30 Slope/aspect:

Last observation: 1988-06-30 Size (acres):

Location:

(TAKE PRIMARY HWY CA. 11 MILES WEST OF BYNUM, TURN LEFT ON PRIMITIVE ROAD. TAKE THIS WEST PAST KNOWLTON RANCH CA. 2.5 MILES AND THEN HIKE SOUTH CA. 0.2 MILE TO BOG).

Element occurrence data:

General site description:

EVIDENT IN BOG WITH BETULA GLANDULOSA, TRIGLOCHIN SP. NO SPHAGNUM.

Land owner/manager:

BLACKLEAF WILDLIFE MANAGEMENT AREA

Comments:

Information source: BOTANIST, MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVENUE, HELENA, MT 59620-1800.

Specimens: LACKSHEWITZ, K. (11468). 1988. SPECIMEN #115854. MONTU.

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MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Blackleaf Wildlife Management Area

Scientific Name: CYPRIPEDIUM CALCEOLUS VAR PARVIFLORUM
Common Name: SMALL YELLOW LADY'S-SLIPPER

Global rank: G5 Forest Service status: SENSITIVE
State rank: S2S3 Federal Status:

Element occurrence code: PMORC0Q090.062
Element occurrence type:

Survey site name: BLACKLEAF CREEK
EO rank:
EO rank comments:

County: TETON

USGS quadrangle: BLACKLEAF

Township: Range: Section: TRS comments:
026N 008W 10 N2

Precision: S
Survey date: Elevation: 4720 - 4760
First observation: 1996-06-20 Slope/aspect: LEVEL
Last observation: 1996-06-20 Size (acres): 40

Location:
BLACKLEAF CREEK PONDS, CA. 1.2 AIR MILES NORTHWEST OF BLACKLEAF.

Element occurrence data:
100-500 PLANTS, LATE FLOWERING.

General site description:
MOIST TO WET, PARTIALLY SHADED GLACIAL OUTWASH PLAIN STREAM TERRACE.
CALCAREOUS PEAT AND FINE ALLUVIUM PARENT MATERIAL, PEAT SOIL.
ASSOCIATED SPECIES: SALIX BOOTHII, BETULA GLANDULOSA, CAREX
UTRICULATA, C. AQUATILIS.

Land owner/manager:
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)

Comments:
OBSERVED BY LESICA, CARR, AND HANNAH. DISTURBANCE BY LIGHT LIVESTOCK
USE. SPECIES PROBABLY SCATTERED THROUGHOUT UPPER COW CREEK.

Information source: LESICA, PETER. DIVISION OF BIOLOGICAL SCIENCES,
UNIVERSITY OF MONTANA, MISSOULA, MT 59812. PHONE
406/728-8740.

Specimens:

October 31, 1996

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MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Blackleaf Wildlife Management Area

Scientific Name: SALIX SERISSIMA
Common Name: AUTUMN WILLOW

Global rank: G4 Forest Service status: WATCH
State rank: S1 Federal Status:

Element occurrence code: PDSAL022P0.008
Element occurrence type:

Survey site name: BLACKLEAF CREEK
EO rank:
EO rank comments:

County: TETON

USGS quadrangle: BLACKLEAF

Township: Range: Section: TRS comments:
026N 008W 10 N2

Precision: S
Survey date: Elevation: 4720 - 4760
First observation: 1996-06-20 Slope/aspect: LEVEL
Last observation: 1996-06-20 Size (acres): 40

Location:
BLACKLEAF CREEK PONDS, CA. 1.2 AIR MILES NORTHWEST OF BLACKLEAF.

Element occurrence data:
500-1000 PLANTS, FLOWERING.

General site description:
MOIST TO WET, PARTIALLY SHADED GLACIAL OUTWASH PLAIN STREAM TERRACE.
CALCAREOUS PEAT AND FINE ALLUVIUM PARENT MATERIAL, PEAT SOIL.
ASSOCIATED SPECIES: SALIX BOOTHII, BETULA GLANDULOSA, CAREX
UTRICULATA, C. AQUATILIS, SALIX CANDIDA, S. PLANIFOLIA.

Land owner/manager:
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)

Comments:
OBSERVED BY LESICA, CARR, AND HANNA. DISTURBANCE BY LIGHT LIVESTOCK
GRAZING. SPECIES MAY BE SCATTERED THROUGHOUT UPPER COW CREEK.

Information source: LESICA, PETER. DIVISION OF BIOLOGICAL SCIENCES,
UNIVERSITY OF MONTANA, MISSOULA, MT 59812. PHONE
406/728-8740.

Specimens:

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MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Blackleaf Wildlife Management Area

Scientific Name: ONCORHYNCHUS CLARKI LEWISI

Common Name: WESTSLOPE CUTTHROAT TROUT

Global rank: G4T3 Forest Service status: SENSITIVE

State rank: S3 Federal Status:

Element occurrence code: AFCHA02088.113

Element occurrence type:

Survey site name: COW CREEK

EO rank:

EO rank comments:

County: TETON

USGS quadrangle: VOLCANO REEF

Township: Range: Section: TRS comments:
026N 008W 05

Precision: M

Survey date:

Elevation: 4900 -

First observation: 1990

Slope/aspect:

Last observation: 1990-08-10

Size (acres):

Location:

FOLLOW COUNTY ROAD WEST FROM BYNUM TO WITHIN A FEW MILES OF BLACKLEAF CANYON, THEN NORTH CA. 2 MILES ON PRIMATIVE ROAD TO COW CREEK.

Element occurrence data:

SAMPLE OF 15 FISH TESTED GENETICALLY PURE BY ELECTROPHORESIS.

General site description:

STREAM SEGMENT WITH RESIDENT POPULATION.

Land owner/manager:

PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)

BLACKLEAF WILDLIFE MANAGEMENT AREA

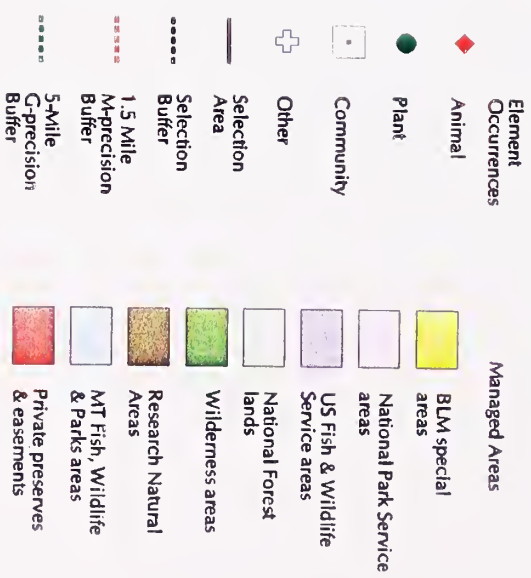
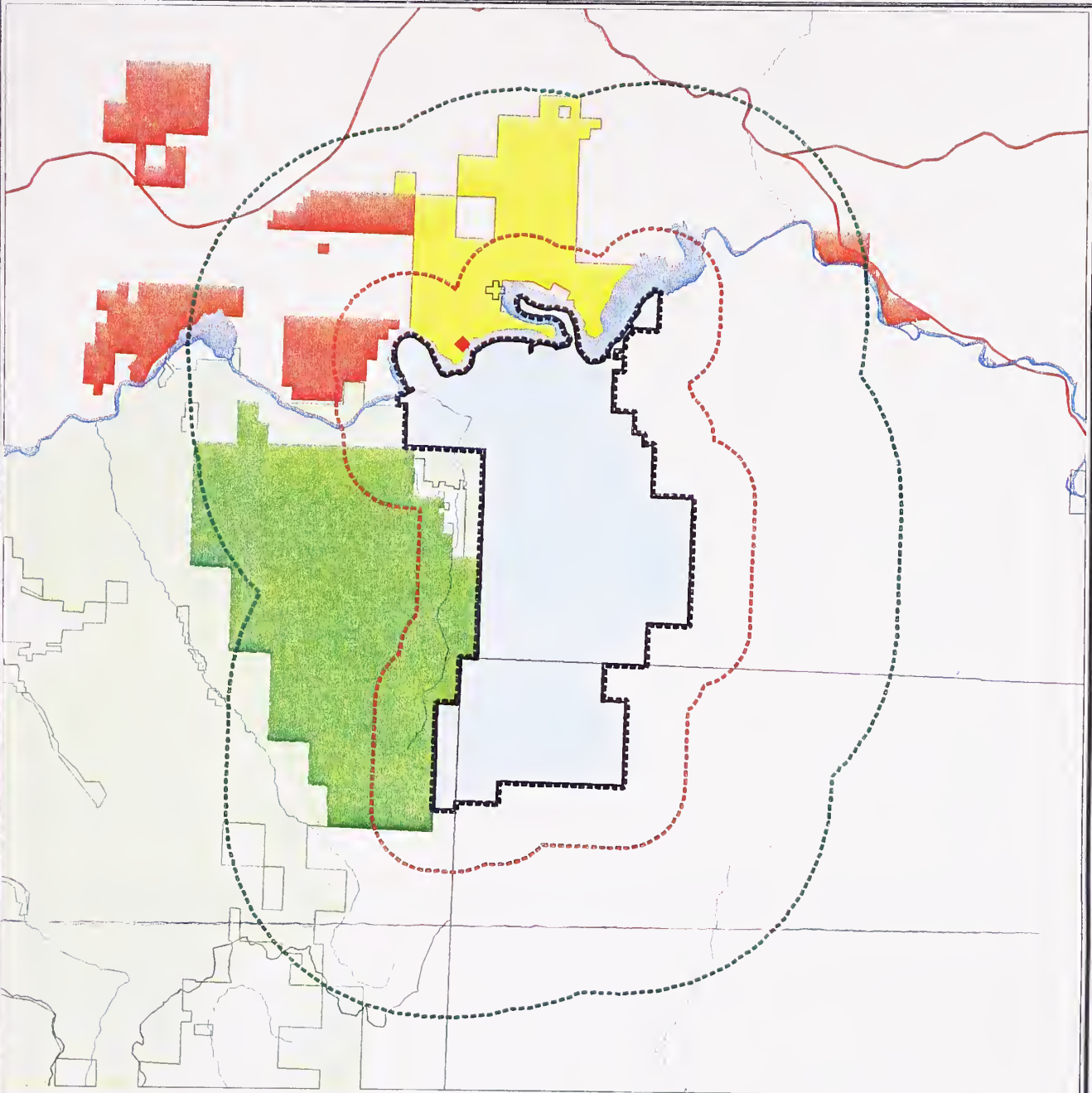
Comments:

LOCATION MAPPED IS COLLECTION SITE.

Information source: LEARY, R. F. 1990. [LETTER OF 2 OCTOBER TO BILL HILL, MDFWP, RE: GENETIC ANALYSIS OF TROUT SAMPLES FROM ROCKY MTN FRONT AREA.]

Specimens:

Species of Special Concern Search Area: Beartooth Wildlife Management Area



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MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Beartooth Wildlife Management Area

Scientific Name: HALIAEETUS LEUCOCEPHALUS
Common Name: BALD EAGLE

Global rank: G4 Forest Service status: ENDANGERED
State rank: S3B,S3N Federal Status: LTLE

Element occurrence code: ABNKC10010.140
Element occurrence type:

Survey site name: BEARTOOTH
EO rank:
EO rank comments: CURRENT

County: LEWIS AND CLARK

USGS quadrangle: BEARTOOTH MOUNTAIN

Township: Range: Section: TRS comments:
013N 003W 02

Precision: M
Survey date: Elevation: 3700 -
First observation: 1992 Slope/aspect:
Last observation: 1995 Size (acres):

Location:
ALONG HOLTER RESERVOIR, CA. 4 RIVER MILES DOWNSTREAM FROM THE GATES OF
THE MOUNTAINS AND CA. 1.5 MILES UPSTREAM FROM COTTONWOOD CREEK.

Element occurrence data:
RESULTS OF ANNUAL NEST SURVEYS ON FILE AT MTNHP.

General site description:
NEST SITE AND TERRITORY.

Land owner/manager:
SLEEPING GIANT AREA OF CRITICAL ENVIRONMENTAL CONCERN
BLM: BUTTE DISTRICT, HEADWATERS RESOURCE AREA
BEARTOOTH WILDLIFE MANAGEMENT AREA

Comments:

Information source: FLATH, DENNIS. 1995. [MEMO OF ? OCTOBER
SUMMARIZING SURVEY RESULTS FOR THE MONTANA BALD
EAGLE WORKING GROUP.] 8PP.

Specimens:

October 31, 1996

MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record
Beartooth Wildlife Management Area

Scientific Name: BIRD ROOKERY
Common Name: BIRD ROOKERY

Global rank: Z Forest Service status:
State rank: Z Federal Status:

Element occurrence code: OROOKERY//.090
Element occurrence type: BIRD ROOKERY

Survey site name: HOLTER LAKE
EO rank:
EO rank comments:

County: LEWIS AND CLARK

USGS quadrangle: BEARTOOTH MOUNTAIN

Township: Range: Section: TRS comments:
014N 003W 34 SW4

Precision: M
Survey date: Elevation: 3700 -
First observation: 1994-08 Slope/aspect:
Last observation: 1994-11-17 Size (acres):

Location:
ON SHORE OF HOLTER LAKE, JUST WEST OF INDIAN TRAIL RIDGE.

Element occurrence data:
GREAT BLUE HERON. CA. 40 NESTS.

General site description:
PONDEROSA PINE/DOUGLAS FIR WOODS.

Land owner/manager:
SLEEPING GIANT AREA OF CRITICAL ENVIRONMENTAL CONCERN
BLM: BUTTE DISTRICT, HEADWATERS RESOURCE AREA

Comments:
OBSERVED BY GAYLE JOSLIN, DFWP.

Information source: ZOOLOGIST, MONTANA NATURAL HERITAGE PROGRAM, 1515
EAST SIXTH AVENUE, P.O. BOX 210800, HELENA, MT
59620-1800. 406/444-3009.

Specimens: